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Project Portal User-Centered Design and Engineering Report

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The work described in this report was performed by the User-Centered Design and Engineering Branch (Code 53621) of the Command and Control Technology and Experiments Division (Code 53600), Space and Naval Warfare Systems Center Pacific (SSC Pacific), San Diego, CA.

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EXECUTIVE SUMMARY

OBJECTIVE

The User-Centered Design and Engineering (UCD&E) team constantly is improving the project management tool called the portal. The portal is a web interface SSC Pacific software solution for project managers. Based on web navigation schemes, it follows time-tested human factors of web design. Successful software must be easy to use, ergonomic, and simple in its design. This report details research the UCD&E team conducted to improve those three areas in the portal software interface.

METHODS

The report follows research conducted in many areas. Wireframe usability tests conducted in April 2015 helped isolate user design issues that once resolved made using the portal software much more intuitive. Usability tests conducted in May 2015 focused on improving navigation, interface design and user task performance. Part of the study included an A/B study. The UCD&E team used an eight-question survey to compare four competing design options to understand which of four methods of secondary portal navigation users deemed “easier to use.” The result of the A/B study showed two choices testing superior to the rest. Those solutions are detailed in this report. Testing included rapid user testing. Rapid user testing, allowed suggested user changes to be made to the user interface to be made as soon as a problem is identified. This allowed the solution to be validated quickly whether the solution was successful or needed further work. Research captured a majority of user experience issues.

CONCLUSIONS AND RECOMMENDATIONS

Based on research findings, the UCD&E team found flaws in the software and suggested improvements for the software development team. Issues found in the portal software study will be used to improve new versions of the portal software.

Overall, usability test results revealed that the interface design and the planned interaction models were highly successful. Users who attempted to create a project using methods provided in the project portal interface were successful. Every user completed the task, with minimal delays or confusion, and expressed confidence in repeating the task in the future. There were no user-experience-related mistakes. Clear portal definitions and instructions led to successful user performance. The Input/Output screen transitions and graphic user interface wizards performed according to users’ expectations. Users could navigate successfully through portal software solution paths and could complete tasks in every instance. Users appreciated the ease and forethought designed into the portal as a whole, and the straightforward nature of the graphic user interfaces. Users were delighted with the look and feel and felt optimistic that they could use the interface to perform their project management tasks. Users successfully completed the tasks tested in any given round.

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1. PRODUCT AND DESIGN GOAL

The User-Centered Design and Engineering (UCD&E) team joined the Process Architecture Improvement project to employ user research and iterative user-focused testing to help design a single space for Space and Naval Warfare System Center (SSC Pacific) project managers to access the project management content necessary to meet Center requirements. Throughout this process, user feedback obtained presented data-based justification for a hands-on, customized project management experience based on characteristics unique to each project and project manager.

The portal is a project management tool based on web navigation schemes, and followed time-tested human factors heuristics for web design. An example of the portal software interface is provided in Appendix E, where several sample screens give a preview of the portal's appearance and how it is organized and used.

Portal test results detailed in this report focus on many areas specific to improving the portal and incorporating user feedback. The UCD&E team conducted multiple rounds of user-centered research that incorporates structural and content requirements provided by the product team for inclusion in the portal. This research assessed the product's navigation elements, its consistent use of language, how well it supports shared understanding of the portal's underlying concepts, and whether it would enable users to meet the administrative requirements with which project managers must comply.

Subsequent tests focused on the tasks associated with creating, joining, and managing project resources through the project portal, using task-based analysis and think-aloud protocols to examine the facility with which users performed various of basic tasks required in project management work.

The UCD&E team conducted A/B comparison tests designed to examine users' preferences and ability to properly differentiate between various methods of displaying and navigating certain design elements within the portal. An overview of A/B studies is provided in Section 4. Detailed results of the A/B comparison tests are provided in Appendix C.

Elements of navigation, language usage, and inter-portal communication were tested and analyzed to assess successes and failures of several iterations of portal design. Test protocols were primarily designed to elicit feedback on how well various incremental prototypes of the project portal met participants' mental models and usage expectations of how the software should work. Additional goals included evaluating the navigational elements, wording of language-based elements, goal-based content, and overall usefulness of the interface.

Unfortunately, not all of the feedback gained could be implemented into the current portal design. To the extent that users focused on tools or capabilities not in the current scope of the portal design, the UCD&E team documented these considerations for future use to add product value and facilitate user adoption of the portal for future portal software versions. The UCD&E team then produced and documented iterative design recommendations to communicate research findings to the product and development teams. These recommendations may not be fully or consistently incorporated into the end product, due to decisions and constraints beyond the control and influence of the UCD&E team.

This inconsistency may prevent the portal from realizing its fully designed potential. Research suggests that if project managers' expectations for project management and process support are not fully met, they may lose confidence in the overall product suite and the adoption rate would subsequently be low.

2. WHY UCD&E?

SSC Pacific's UCD&E team develops solutions for a variety of customer needs, from developing in-cab geo-visualization systems for the United States Marine Corps, to designing the physical layout of an emergency operations center, to prototyping mission planning applications for the submarine and surface communities, and more. The team's methodology supports product design, process improvement, technical writing, and instructional design.

At the most basic level, UCD&E is about the user. Through user-focused testing, interviews, surveys, knowledge elicitation, cognitive walk-throughs, task-based analysis, think-aloud protocols, card storming, comparison testing, knowledge mapping, and other techniques, UCD&E researchers can identify, isolate, and focus on the elements most basic to the needs and desires of the user population, and join them to the mission goals of the stakeholders. By designing the capabilities of the system around these core principles and metrics, stakeholders successfully appeal to the user base, designing a functional, desirable, valuable product with high satisfaction, low levels of rework or user support, and high adoption rates.

User-centered design is an approach that focuses early on user needs and subsequently leverages sound human engineering and scientific methodologies, which include a significant amount of analysis, to provide early definitions of user-focused requirements, rather than function-focused requirements. By employing user-centered design (UCD) methods, we enhance measures of effectiveness and measures of performance and improve situational awareness.

The UCD method involves direct knowledge elicitation sessions with the users, and is key to developing task-based designs. Through this method the team develops cognitive models, use cases, and prototypes that directly support rapid development and other agile processes. At the highest level, UCD products focus and guide integration efforts to support systems engineering towards achieving total system performance, and at the lowest level directly influence the mission effectiveness of each person using tools based on UCD products and processes.

The UCD&E team exists to ensure that products produced throughout the Center and elsewhere within the Department of Defense support the goals, needs, and wants of end users, and balance those goals, needs, and wants with those of the stakeholders. Through proven methodologies used by leading companies known for providing exceptional user experiences, the UCD&E team develops requirements, prototypes, and deployable end-products that significantly improve end-user effectiveness, increase situational awareness, and reduce total cost of ownership.

3. DEMOGRAPHICS

Throughout these studies, the UCD&E team maintained strict methods and protocols for advertising, selecting, scheduling, processing, testing, and reporting all interactions with participants across the Center. Thirty-two SSC Pacific employees (civilian and enlisted) participated through randomized targeting of a diverse population through email advertisements. Participants then self-selected and scheduled available times with the UCD&E team for testing. The participants were distributed as follows:

- Gender: Both male and female
- Experience: Less than a year, up to 16 plus years
- Number of Concurrent projects: From 1–11 plus, with most working on 2–4 projects at a time

Figure 1 details the selection of participants across the Center. Selection of participants was pseudo-randomly distributed, varying across experience levels and competencies. This mix of participants gives the UCD&E team confidence in its findings and that results found are sufficiently substantiated.

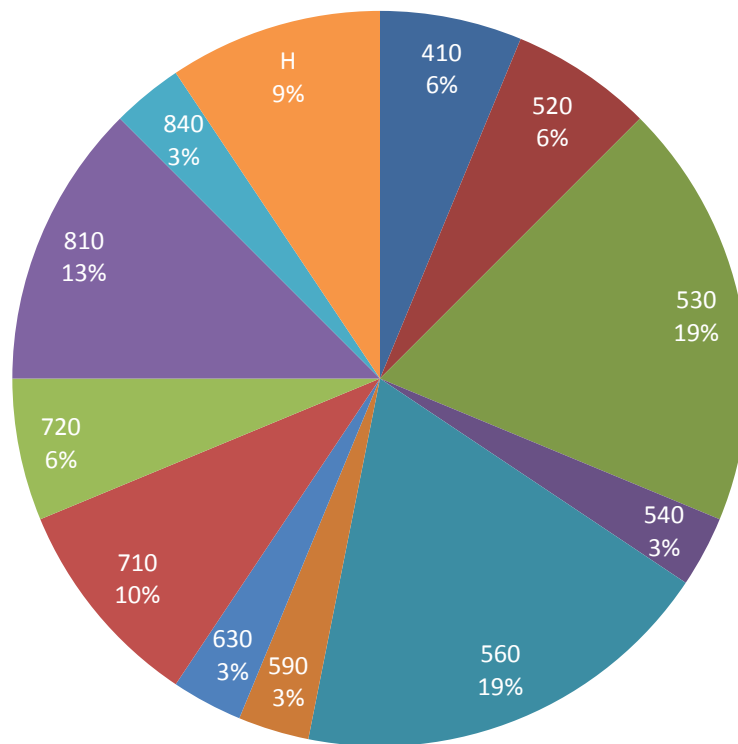


Figure 1. Participant demographics.

4. TESTING RESULTS

4.1 INITIAL RESEARCH

Initial user research into the project management portal indicated that the User-Centered Design and Engineering team's first navigational layout and workspace iteration was moderately successful. Users largely appreciated the goal of the portal and the design of its layout. Throughout the portal, however, there remained a fundamental need for improved clarity across the interface to address shortfalls with the overall content, task completion, and value proposition for the user. Subsequent design focus was directed at improving these interactions in the context of becoming the single interactive source for all Center project management processes.

Specifically, the areas identified for improvement after the first round of testing included the following:

- Reassess incorrect assumptions about the Center project managers
- Improve language and navigational clarity regarding content, user goals, and value
- Re-center focus on product management processes instead of day-to-day project management tools
- Support and encourage project managers' interaction with Center processes
- Lessen the burdens on branch heads and business financial managers by facilitating project managers' access to quality information sources
- Ease the burdens on both project managers and leadership by designing affordances to leverage existing information
- Optimize existing information to be easier to understand such as status reports, data calls and other required documentation
- Add value through strategic content location
- Improve professionalism and ability to learn with consistent stylized icons and symbols
- Generate consistency across navigation elements, interaction behaviors, and language

These recommendations were all based on initial user research, knowledge elicitation sessions, and heuristic reviews of the initial portal design. Further information on this round of testing is in Appendix A.

4.2 APRIL TEST

Wireframe usability tests conducted in April revealed that the portal interface design and planned interaction models were increasingly successful. Users were delighted with the portal's look and feel and felt optimistic that could perform project management tasks through the interface. The ongoing challenge is to design an interface that co-located all tools and resources required for project management in an easily understood and navigable format.

The resultant recommended design changes from the UCD&E team focused on the following:

- One-stop Shopping: Decrease user workload and frustration while increasing buy-in and participation by providing a single source to complete desired tasks
- Navigation: Provide users with a simple, clear navigation experience

The resultant recommended design changes continued:

- Plain Language: Use clear and consistent terminology to increase recognition, ability to learn, and user trust
- Support User in Task Completion: Ensure that the system and interface take the burden for information recall and task recognition off the user
- Increase Interface Transparency and Communication: Tailor the interface to communicate value specific to the user.

Through the UCD&E team's iterative design-test-revise-develop model, design updates were planned, recommended, and mostly implemented as the portal graduated from low-fidelity wireframe testing to live website-based capabilities. The team saw continual benefits as it helped identify and isolate user expectations and flaws in the portal design. Additionally, as the product team and development team adopted the UCD&E team's recommendations, the Center's user community ultimately received a more consistent and professional user experience. More information about the results of the April testing is located in Appendix B.

4.3 MAY TEST

Usability tests of early portal iterations conducted in May continued to show successes, especially navigation, interface design and user task performance. Users continued to give overwhelmingly positive feedback about the look and feel of the portal and demonstrated that they could perform basic initial project management tasks through the interface with few issues. Priorities developed from the results of the May tests included the following:

- Removing, de-emphasizing, or reducing distractions caused by project management body of knowledge (PMBOK) Activities and Process Framework Overview
- Improving placement and timeliness of feedback and feed-forward mechanisms
- Using clear and consistent terminology to increase recognition, ability to learn, and user trust
- Correcting bugs and idiosyncrasies in the website design, as detailed in the May report

Documented results were compiled and reported to the product and development teams as part of a larger report, and as a set of design documents that pointed out each feature of the portal, along with the UCD&E team's recommendations. These recommendations became part of the continuously updated set of design documents maintained by UCD&E and communicated to the development team in weekly meetings and other intermittent interactions. More information about the results of the May testing is located in Appendix C.

4.4 A/B STUDY

At the same time, the User-Centered Design and Engineering team used an eight-question survey to compare four competing design options to understand which of four methods of secondary portal navigation users deemed "easier to use." The result of the survey showed two choices testing superior to the rest. Heuristic evaluations of these two designs concluded that one was likely insufficient to support the textual density of the content. As a result, the project Activity navigation scheme was redesigned as part of the left-hand navigation menu to match the results from this A/B study.

Based on the findings of these studies, it became evident that the majority of major issues impeding user performance in the portal had been identified. Planned resolution steps were put in place. At the same time, the development team was beginning heavy development work to match the designs proposed by the UCD&E team. Due to these factors, traditional user testing methodologies performed previously were foregone to adopt a leaner approach designed to more quickly and effectively identify and correct portal issues. For more information on the May user tests and A/B study, see Appendix C.

4.5 RAPID USER TESTS

Rapid User Testing is a tool used often in UCD&E in situations where a research team wants to speed up the iterative process of “test-design-code-repeat.” In Rapid User Testing, changes to the user interface are made as soon as a problem is identified and a solution is clear. These changes can usually be done in a single day with minimal investment in time, equipment, or user participation. Rapid User Testing was particularly useful for this project, as the UCD&E team supported the rapid development schedule employed by the development team to successfully meet tight schedule demands.

As part of the effort in supporting the SSC Pacific project portal, the UCD&E team conducted three rounds of Rapid User Testing to quickly and efficiently identify and correct the major interface impediments and system bugs in the existing design. As part of this action, several key interface elements and system bugs were identified, documented, and corrected. The most significant issues to be addressed and corrected include the following:

- Shortening computer wait times between tasks
- Correcting issues with the personnel lookup tool
- Debugging and implementing fixes for several bugs discovered during testing

The vast majority of elements the UCD&E team tested, beyond those issues documented here, tested extremely well. Users successfully completed all tasks given them, apart from those exceptions.

Overall, the three rounds of user testing proved to be sufficient to capture the large majority of user experience issues in what the UCD&E team could test. The pace was fast enough to prevent the development team from doing unnecessary rework in most cases, but moderate enough to be successful with a smaller research staff. The UCD&E team would have ultimately liked to do more testing on other areas of the design, but due to schedule constraints from management, and personnel constraints in the development team, this became unrealistic. For more information on the Rapid User Testing performed by the UCD&E team, please see Appendix D.

5. CONCLUSION

Initial user research into the SSC Pacific Project Management Portal surfaced a strong need for a clear value proposition for the project portal. As a result, it is critical to communicate to all users that the project portal focuses solely on the Center's project management processes. To bring value to these key users, co-locating tools and resources a project manager will need to accomplish Center-level project management process tasks is essential. Project managers' primary focus is on meeting project needs for performance, finance, and schedule. This need, and the importance of attending to the priorities of their sponsors, requires that the project portal deliver real value, and not become just demand compliance. The portal's value can only be fully appreciated when it seamlessly becomes part of a project manager's existing activities, rather than just one more onerous task that must be endured.

Usability test results revealed that the interface design and the planned interaction models were highly successful. Users were delighted with the look and feel and felt optimistic that they could perform their project management tasks through the interface. Virtually everything the UCD&E team tested, beyond issues documented in this test report, tested extremely well. Users successfully completed the tasks tested in any given round, apart from these exceptions.

Test results show the portal design is easy to understand, making repeated tasks easy to learn and remember for participants. As each participant repeated tasks, the time and effort required to complete the task was reduced with each repetition. Repeated performances resulted in easier and quicker task completion. This result is a key finding and a major success as well. The portal design enables users to quickly become "experts" in performing basic tasks after two or three instances. This finding suggests that the site, as designed, will lead to improved experience and greater performance capabilities among most of the user population.

The UCD&E team concludes that the amount of user testing was sufficient to capture the large majority of user experience issues in what the UCD&E team had available to test. Later-developed functionality was not user-tested in an active environment due to schedule and development issues. Generally, the pace of testing was fast enough to keep the development team from doing unnecessary rework, but moderate enough to be performed with a moderate-sized research team.

Although the overall design tested very well, flaws associated with the use of plain language and clear context were observed in various elements of the portal design. Additionally, continued user research through multiple rounds of usability tests highlighted the need for a strong and clear value proposition for the product. The UCD&E team corrected these flaws as part of its final design recommendations, but any additions in language or functionality not included in those designs is in danger of eroding and damaging the value proposition presented to the users.

Finally, as previously noted, only providing users a product focused solely on Center project management processes brings little to no value to targeted users within the project manager and Integrated Product Team (IPT) lead population segments. Unless the portal can provide users a universally delightful experience and a non-negative value to their project work, participation will struggle and adoption will lag to the point that the portal will bring little benefit to the Center. The

UCD&E team is confident that its iterative design-test-revise-develop testing model has produced many benefits as it helped reveal user expectations and flaws in webpage designs. Additionally, with continued attention to UCD&E's design recommendations, the Center's user community will ultimately be well served with a consistent and professional user experience.

6. LESSONS LEARNED

As team members and collaborators in this novel but important project, the UCD&E team has discovered five lessons learned from its participation. These are documented to track and improve upon UCD&E performance in any further iterations of this project and to further promote professionalism in other project relationships.

1. A clear communication path of agreed communication methods needs to be established and used for tracking and resolving issues as they occur. Communications issues arose when dealing with accepting and disseminating documents with other stakeholders. Previously, the UCD&E team had a preferred method of internal communication of test results, PowerPoint slides, Excel[®] and design documents, wireframes, etc. using a configuration management system meaningful to the team. In this project, other team stakeholders used other methods (e.g., JIRA) to communicate, track bugs and design issues, and manage the project. In the future, the UCD&E team needs to be especially clear upfront about how and when to participate in these tracking systems, especially when communicating design changes and deliveries. To avoid confusion, all team participants need to be using the same management, bug tracking, and communication methods.
2. The UCD&E team should avoid communicating directly with other teams using low-fidelity wireframes, unless it is a critical, emergent circumstance that necessitates sharing them with this larger audience. After delivery additional communication issues arose particularly relating to design sketches. There were some miscommunications and assumptions made about low-fidelity sketches when they were disseminated to the development and management teams, which caused unneeded issues during subsequent interactions. Communication through high-fidelity prototypes is more helpful in accurately demonstrating the design's interaction and intent with both stakeholders and developers.
3. A detailed explanation of the role and importance of UCD&E methods is needed. This explanation would detail the practice and implications of good user-centered design is an ongoing process. Despite many customers, stakeholders, and other value-chain partners realizing the need for proper UCD&E in their products' design cycle, the UCD&E team cannot assume that they appreciate or understand the complexities and nuances of how or why this effort is performed. In the future, the UCD&E team needs to better familiarize all parties with UCD processes and terminology, encouraging their appreciation of human factors and UCD efforts. Through consistent communication and instruction about UCD processes, benefits, and results to all parties, we can engender real understanding, and avoid many misunderstandings and disputes.
4. The timeline presented initial problems for the UCD&E team. Because of uncertainty surrounding the level of effort being provided to the project by the UCD&E team, there were a few speed bumps in getting the team sufficiently tasked and manned in the beginning. In the future, a fully successful integration of the agile development and user-centered design processes requires a more formal ramping up stage (i.e., a "Sprint Zero")

focused on user research and initial design. Because this work was accomplished in parallel with the development of the site, it was initially difficult to get far enough ahead of the development process to sufficiently implement all of the UCD&E team's methods and best practices for conducting proper focused user testing ahead of implementation by the development team.

5. Managing the expectations of the user population is extremely important to the ultimate goal. During testing cycles, there are intermittent periods where the UCD&E team asks open-ended questions of the test participants. Some of these questions focus on user desires, preferences, needs, likes, and expectations. From the user response, the team can determine which functionalities and features are most important to include, how they should be structured, best use of navigation elements, etc. During this process, it became evident that a couple things were happening simultaneously. Test participants were developing unrealistic expectations of what the portal would ultimately provide. Also, users' preferences and needs diverged greatly from what stakeholders had asked to be developed. Finally, some users at the Center were being given information about the portal and its eventual capabilities before the design was finished.

These issues were counterproductive for a couple of reasons. Because of the intimate nature of the close-knit groups and the ability for information to spread quickly at the Center, false information can greatly affect the expectations and rate of adoption of these future users if the product doesn't meet those expectations. Additionally, if users have preconceived notions about the final product before they're tested, those biases can creep into the findings, thereby affecting the overall results. Likewise, if users are influencing the design of the final product, it inhibits the UCD&E team's ability to create the final design to account for the entire tested user population.

As a result, future efforts need to control more tightly the information flow regarding the purpose and goals of the product being designed. At times, the message simply outpaced the design, and that seems to have set up some issues of confusion and mistrust among some of the ultimate user population. Through future efforts to manage the value proposition of the product at all stages of development, the UCD&E team can avoid delivering a product that is not in line with users' expectations, thereby slowing adoption and forfeiting trust.

APPENDIX A

INITIAL PORTAL USER RESEARCH TEST RESULTS

MARCH 3–4 2015 AT SSC PACIFIC

APPENDIX A

EXECUTIVE SUMMARY

Initial user research into the project management portal indicates a fundamental need for clarity across the product interface to address shortfalls with the overall content, goals, and value to the user. The team's focus moving forward should remain on the product's goal of becoming the single interactive source for all Center project management processes.

Participants said the following:

“The project management guide is found through a series of search and rescue steps on corporate assets to find the current version.”

Future designs, recommendations, and briefings by the User Centered Design and Engineering (UCD&E) team will address the following:

1. Incorrect assumptions about project managers at the Center
2. Lack of clarity across the product regarding its content, goals, and value
3. Improved focus on Center product management processes instead of day-to-day project management tools
4. Supporting and encouraging proactive interaction with Center processes by project managers
5. Easing the burdens on critical players, such as branch heads and business financial managers, by providing their project managers with alternative, quality information sources
6. Easing the burdens on both project managers and leadership by designing for information roll-up and leveraging existing information for easier and more efficient status reports, data calls, and other required documentation
7. Adding value by using strategic content placement
8. Improving the professionalism and ability to learn and ease of use of the interface with custom icons and symbols
9. Continuing to address consistency across navigation elements, interaction behaviors, and language

These user-centered design recommendations are based on initial user research and heuristic reviews of the product's goals and requirements. Additional user research, including usability testing, will modify and contribute to these findings.

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PRIMARY ACTION ITEMS

OVERVIEW

This section contains a listing of action items that were found during the early stage of portal research. Table A-1 shows global featured action items uncovered during the initial user research. Additional detail about each of these items is in the Findings Section.

Table A-1. Global featured action items uncovered during initial user research.

Topic	Action Item	Priority
Alter the value proposition: language used throughout the portal is incongruent with users' mental models	Increase the value proposition of the product by defining its role as a single source for Center project management processes. Use consistent and clear language to differentiate this "reference library" from a set of day-to-day project management tools.	High
Remove assumptions: users do not share a universal understanding of the Center's project management processes	Incorporate self-directed learning opportunities into the interface to account for users with little to no awareness of the Center's project management practices.	High
Remove assumptions: not all users proactively complete Center-level project management processes	Communicate Center-level process tasks and deadlines directly to the project managers, bypassing the branch heads.	High
Change the primary information source: remove the burden from the portal user	A) Build user's trust by ensuring easy access to current information whenever a user accesses the product. B) Emphasize to branch heads and other support staff that this product will relieve them of the burden of the "middleman" in their relationships with project managers.	High
Create efficiency by rolling-up: simplify interfacing with leadership	Keep all project content visible and exportable by the project manager. Content should pre-populate (cross-pollinate) across and within all Center project management processes and tools.	Medium
Separate disparate elements: differentiate between day-to-day project management tools and Center-level project management processes	Focus initial increments on only managing Center-level project management processes. Avoid forcing changes to project manager's day-to-day methods for monitoring finances, performance, and scheduling.	Medium

Table A-1. Global featured action items uncovered during initial user research (continued).

Topic	Action Item	Priority
Make calendar items interoperable	Translate process deadlines into formats typically used by project managers to export from the portal, including but not limited to: GANTT charts, Microsoft Outlook® calendar items (desktop and web compatible), CSV tables, Microsoft Visio®, and Microsoft Project®. Focus on interoperability across multiple platforms; (do not make assumptions about which software users prefer).	Medium
Increase ability to learn and efficiency with consistent semiology	Evaluate the symbol libraries already available for the Center and hire a graphic designer to help customize and unify the icons for the different product elements.	Medium
Add value through content: team management	Investigate surfacing information from Navy ERP about who is charging to a project, and co-locating other information about team members inside the product.	Low
Add value through content: financial	Investigate automatically tracking financial information that the business financial managers already supply and display it within the product to provide visibility to project managers about their projects' expected spending, planned spending, and actual spending rates.	Low
Add value through content: risks	Investigate surfacing risk information from its current project management tool, and other risk-tracking methods for potential interoperability for visibility by project managers.	Low

Additional Action Items that surfaced during the user research and heuristic reviews and which the UCD&E team could address through their design process have been incorporated into the baseline design. The issues that were included inconsistent use of language, problems with the navigational structure, and alignment problems.

MISSING OR REQUESTED CONTENT AND FEATURES:

- Risks
- Financial view - line graph with the expected spending curve, planned spending curve, and actual spending curve
- The project management plan
- Gantt charts
- Customization
- Options for archiving content and submitted documents
- Tracking for projects in the proposal phase prior to initiation

PRODUCT AND DESIGN GOAL

OVERVIEW

This section contains product and design goals that were used in the portal evaluation study. The goal of this initial product is to provide a single space for Space and Naval Warfare Systems Center (SSC) Pacific's project managers to access any type of Center project management content necessary for their project. Additionally, the space is expected to provide customized project management assistance based on the characteristics of the projects a project manager is handling.

GOAL OF THIS RESEARCH

Research focused on the initial structural and content requirements for the product (a.k.a. portal). Navigation elements, consistency in language and shared understanding of the language used, and the overall functional requirements of project managers formed the basis of the research.

ASSUMPTIONS

The portal is a project management tool, accessed using CAC identification and specific to the projects a project manager is working on. Users have some background or training in project management processes as practiced at Space and Naval Warfare Systems Pacific.

USERS

OVERVIEW

This section contains an overview of the background of the participants for the portal study. This initial research involved 10 30-minute participant interviews.

Participants had the following dimensions:

- Gender: both male and female
- Experience: less than a year up to 16 plus years
- Number of concurrent projects: from 1–11 plus, with most managing 1–3
- Codes: H000M, 84100, 72120, 63200, 56442, 56441, 56230, 56220, 53223, 52610

The chart shown in Figure A-1 details the top two sources of information about project management. Participants were presented with two randomly presented options. Participants selected the “Switchboard” and “Colleagues” as their primary sources for information about project management. Results in the “Other” category included “Project Manager Box,” “Division Project Manager Meetings,” and “Other Project Manager Sites.”

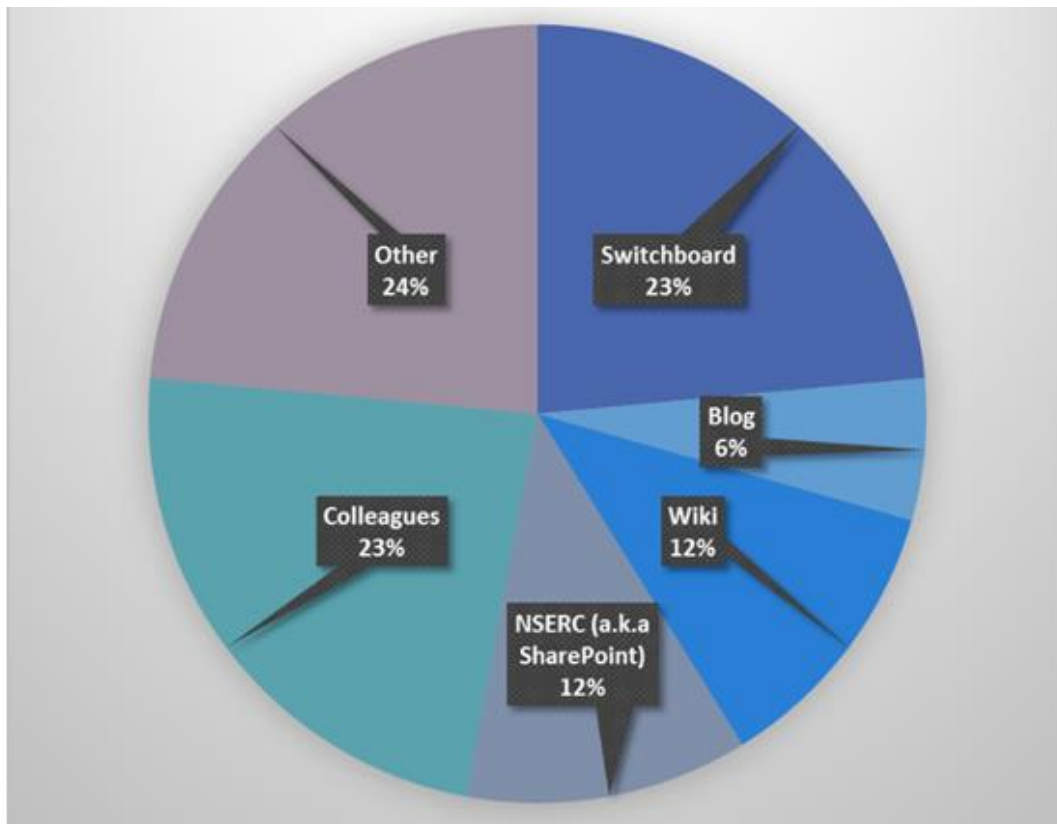


Figure A-1. Information sources for participant project managers.

METHODOLOGIES

OVERVIEW

This section contains three methods that were used for the portal study. The initial round of user research included a semi-structured interview and an initial interface walkthrough, which took more than 30 minutes. The goal of these methodologies was to elicit user knowledge about the domain and to discover task content.

Step 1: Pre-Interview Data Collection

Prior to the user interviews, participants filled out an online form with basic questions concerning the amount of time they've been a project manager, the number of projects they typically manage, and their typical sources of project management information.

Step 2: Semi-Structured Interview

The semi-structured interview included specific scripted questions with the addition of optional probing questions (e.g., "Tell me more..."). The questions allowed participants to elaborate on their answers. This interview was designed to capture basic information about the participants' project management priorities, daily activities, tools, questions, and general methodologies.

Step 3: Initial Interface Guided Walkthrough

The guided walkthrough was designed to step participants through low-fidelity wireframes to observe their initial reactions, and examine how well their expectations of the interface were met. Additional goals included understanding participants' use of navigational elements, their ability to recognize the content presented, and evaluation the overall usefulness of the interface. This part of the research was also conducted in a semi-structured manner, giving the moderator a chance to venture off-script, depending on participant's responses.

FINDINGS

OVERVIEW

This section contains findings found during all parts of the study for this report. In this Section, findings are briefly described with a summary of the finding. Comments from portal users specific to issues shown, the potential impact of the issue is defined, and an action item is given of plans to correct the issue.

ALTER THE VALUE PROPOSITION: LANGUAGE USED THROUGHOUT THE PORTAL IS INCONGRUENT WITH USERS' MENTAL MODELS

Summary

Value proposition concerns what users think they can do with a product or in a space based on multiple interface elements, including but not limited to: language, navigation, look and feel, and affordances. This product created confusion among the participants as to its actual value proposition. The participants' confusion was based primarily on language and content issues. They were unclear as to which aspects of project management the product was addressing. When the researchers asked for further clarification, participants explained that they think differently about day-to-day project management practices and the processes they use to satisfy Center-level project management requirements.

Our study found participants value propositions are not addressed through the portal as presently designed:

- “Project management” and “project management tools” refer to the day-to-day activities and supporting software or tools required to make sure a team and or project is running smoothly. project managers tailor these activities to their team, project type, and environment while executing their projects using multiple tools.
- “Center-level project management processes” is conceptualized, not as day-to-day activities bringing value to the fast-paced, real-time world of project management, but as Center-mandated additions to their project's existing project management lifecycle. Project managers expect to check these processes rarely, as they occur only at single points in the project Management lifecycle.

Participants said the following about the portal compatible preconceived perceived mental models:

“...to me it looks like what upper management wants for a warm and fuzzy. Doing this doesn't mean you're managing well. Do we want it to be how they actually manage their projects or just the information that is needed to push up the chain?”

Participants specified that since these two types of activities occur during different periods, they prefer not to manage them in the same spaces.

Impact

The impact of this distinction is that multiple participants did not see the value of placing day-to-day administrative information and Center-mandated process-related information side by side. Participants did see the value of single source access, but stated they would not be accessing it frequently.

Participants said the following:

“This looks like something the Center would create. And what I mean by that is that I would view most of the bottom half [process phases] as overhead and not valuable to me... [but]...it would be easier to know what was expected of me and then manage to it. If that is the intent, then this would be helpful.”

All participants used different techniques and software for managing day-to-day practices; moreover, most of these were specific to the type of project or product managed. Participants view those tools and practices separately from the Center’s project management processes.

Action Item

Increase the value proposition of the product by defining its role as a single-source entity for Center project management processes. Use consistent and clear language to differentiate the portal, providing process information from day-to-day project management tools.

REMOVE ASSUMPTIONS: USERS DO NOT SHARE A UNIVERSAL UNDERSTANDING OF THE CENTER’S PROJECT MANAGEMENT PROCESSES

Summary

The interviews surfaced a range of perceptions from project managers about the actual processes required by the Center, the tools that support those processes, and the phases of project management (i.e, initiation, planning, executing, monitoring, and closing). Some participants claimed that they are educating themselves on these topics using project management body of knowledge resources to support their independent learning activities, but most of the participants were unfamiliar with these phases.

A project manager with one to five years’ experience handling two to three projects concurrently said the following:

“I’m confused by the different phases [initiation, planning, execution, monitoring, closing] the whole part of the bottom I don’t know what I would do there; I don’t know what that would be.”

Impact

This indicates that our assumption that project managers have a basic working knowledge of the Center’s project management processes is false.

Action Item

Incorporate self-directed learning opportunities into the interface to account for users with little to no awareness of the Center’s project management practices.

REMOVE ASSUMPTIONS: NOT ALL USERS PROACTIVELY COMPLETE CENTER-LEVEL PROJECT MANAGEMENT PROCESSES

Summary

Not all project managers are aware of or current with all crucial action items or due dates for Center-level processes. In some cases, responsibility for these actions seems to fall on branch heads or overarching project managers who then push the requirements to the day-to-day project managers. This is also producing an “eleventh-hour effect,” with project managers stating that they wait until the last minute to complete process tasks because being proactive is not perceived as adding value.

The following comment was given concerning the Center-level project management processes:

“Basically when my branch head emails me and tells me I have to do this, I wait until I'm going to get into trouble if I don't do it. What I found is if I try to be on top of it and be proactive, it takes so much energy to figure out what [the process requirements] are, they will probably change by the time I've figured it out. By the end, I will have done more work than I had to, too much work, and it wasn't helpful to my project.”

Impact

Project managers are pushing deadlines for Center-level processes, creating risk of an overdue process, and creating more work for branch heads by shifting the burden of responsibility onto them for on-time notification and tasking about Center-level processes.

Action Item

Communicate Center-level process tasks and deadlines directly to the project managers, bypassing the branch head.

CHANGE THE PRIMARY INFORMATION SOURCE: REMOVE THE BURDEN FROM THE PEOPLE

Summary

Most of the participants see one or more colleagues as primary sources of information about project management. Typically, the branch head was included as the “go-to-person” for information about any process.

Participants said the following:

“I will contact one of two people in my branch if I need assistance: the branch head and another project manager.”

Impact

There is a potential for misinformation when most communications are not centrally located and shared verbally. However, this strong cultural trend of reliance on word-of-mouth assessments is leveraged to develop trust in the new interface if the interface is well received in the first place. If not, there will be huge pushback at multiple levels and user trust will fail to form.

Action items

1. Build users’ trust by ensuring easy access and current information whenever a user accesses the product.
2. Emphasize to branch heads and other supporting staff that this product will relieve them of the burden of the “middleman” in their relationships with project managers.

CREATE EFFICIENCY BY ROLLING-UP: SIMPLIFY INTERFACING WITH LEADERSHIP

Summary

Most users are looking for faster and easier ways to submit status reports, satisfy data calls, and create presentations. Participants were hopeful that the portal, as a centralized source of process information, including all the information they are already entering into tools like the Work Acceptance tool (WAT), would leverage their data for new items such as status reports.

Participants said the following:

“...Power Point, the Center’s format for project reviews. The quad charts should not be generated [by the project manager], but derived from data that is already there. The quad chart should be automatically generated; the project manager shouldn’t have to do their own. The automation should be in work acceptance, and if it's not there, then add it. The rest of the briefs should be the same way; we shouldn't be extracting data from this tool.”

Impact

The ability to re-use previously entered data to meet Center project management needs would be a large benefit in time and efficiency for most project managers.

Action Item

Keep all project content visible and exportable by the project manager. Content should pre-populate (cross-pollinate) across and within all Center-level project management processes and tools.

Participants said the following:

“The data calls usually come with very little time so they get partial or old data, not as good as could be done if they had an automated way of pulling and maintaining.”

SEPARATE DISPARATE ELEMENTS: DIFFERENTIATE BETWEEN DAY-TO-DAY PROJECT MANAGEMENT TOOLS AND CENTER-LEVEL PROJECT MANAGEMENT PROCESSES

Summary

Most project managers stated that their goal in day-to-day project management is tracking schedule, performance, and critical financial elements. They use a multitude of resources and methods, usually tailoring each one to fit the specific needs of their project. For example, software development project managers talked about using backlogs and user stories, while other project managers talked about installation timelines. However, most agree that some form of this information is the most critical to understanding the real-time health and status of their projects. Projects have three key things: financials, performance, and schedules.

Impact

Without total interoperability and automated data pushes, these elements could quickly go stale in the product. Implementing interoperability and automated data pushes will be a significant challenge, especially for those managing many different types of day-to-day operations. Some of this information may bring value to the project management interface, but is also likely to cause discontent if users are forced to abandon their established methods for a tool that is not tailored to their type of project and their specific day-to-day project management needs.

Action Item

Focus initial increments on only managing Center-level project management processes. Avoid forcing changes to project manager’s day-to-day methods for monitoring finances, performance, and scheduling.

MAKE CALENDAR ITEMS INTEROPERABLE

Summary

Users have a variety of different methods for calendaring or tracking their action items. Most stated that an additional calendar would not be useful and could quickly become stale. However, knowing the required deadlines for the Center processes was still valuable information.

Sub-calendaring note: multiple users reported using a paper-based calendaring system in conjunction with their online tools.

Participants said the following:

“The calendar, unless it’s the best calendar on the face of the earth ... I already have too many calendars”

Impact

Participants said the following about including a calendar in the portal interface:

1. It is likely only a small percentage of users will use it.
2. Items are likely to become stale and not accurately reflect the project to leadership.
3. It must be interoperable for multiple platforms and reflect different methods of use.

Action Item

Translate project management process deadlines into formats typically used by project managers to export from the portal, including but not limited to GANT charts, Microsoft Outlook® calendar items (desktop and web-compatible), CSV tables, Visio®, and Microsoft Project. Focus on interoperability across multiple platforms; do not make assumptions about which software users prefer.

INCREASE LEARNABILITY AND EFFICIENCY WITH CONSISTENT SYMBOLOGY

Summary

To increase recognition, ability to learn, and consistent navigation, the portal as a whole needs to use consistent symbology that is minimal, clear, and unambiguous. Any overuse will demand greater cognitive processing, but consistent use in the same format every time will increase trust and speed up the user's ability to navigate the portal. The symbol library designed and chosen needs to be appropriate to SSC Pacific, follow usability rules, and have a professional look and feel that matches the overarching theme.

For this type of product, the UCD&E team recommends hiring a graphic designer to work in conjunction with the UCD&E team.

Participants said the following:

“...It's rudimentary; the appearance of the icons like that leads me to believe this tool might not be for me.”

Impact

All icons and symbols across the suite will be both consistent and professional. The goal is to have only one icon for every unique element requiring an icon, and to have a professional look and feel that inspires trust.

Action item

Evaluate the symbol libraries already available for the Center and hire a graphic designer to help customize and unify the icons for the different product elements.

ADD VALUE THROUGH CONTENT: TEAM MANAGEMENT

Summary

Project managers expressed an interest in having more information about their team easily accessible (e.g., not in Navy ERP). Content of interest includes, amount charged to the project, total hours charged, hours or charge amount still available, contact information, and group messaging.

Participants also noted that it is difficult to discover the name of every person who is charging to the project.

Participants said the following:

“I would like to know who is charging to those efforts ... there are miscellaneous people who charge to that project. It is another feat of magic through ERP to figure out who those people are. And able to click on that and having the list of individuals who have charged to that [project] and maybe their total amount would be wonderful!”

Impact

Giving project managers access to more information about the financial behavior and general structure of their teams would immediately create value and increase the likelihood of repeated use or more frequent visits to the product.

Action Item

Investigate surfacing information from Navy ERP about who is charging to a project and co-locating other information about team members inside the product.

ADD VALUE THROUGH CONTENT: FINANCIAL

Summary

Project managers expressed varying levels of access to financial information for their projects. Most project managers described weekly-to-daily reports from their business financial manager. This information represents tailored requests and is a large burden on the business financial manager for both consistently updating project managers and individually tailoring their output for specific projects. This established system has multiple facets and methodologies, altering it would be costly and have potentially a negative impact.

Project managers did express interest in an overview of financial information about their project (using a line chart with the expected, planned, and actual spending rates. Spending rates are detailed in Figure A-2. These rates are readily accessible and updated frequently. The managers appreciated the possibility of pushing this chart to management and having it available at all times.)

Project managers had this to say:

“The distribution, my plan and my actuals, then I know if I’m way off my expected spend curve, but do I have a story because my plan tells me that, for example, I have a big purchase coming up. [I’d] rather see it in a line graph with those three elements. What we roll up—spreadsheet number, percentage expended, appropriation plan—three straight numbers also raise a huge red flag if I’m off my plan or appropriation. If I’m off, then I want to drill down, goes for the branch as well. I’d like the line graph with the ability to drill down into the different categories.”

Impact

The financial burn rate of a project is a primary status indicator to both project managers and leadership. Supplying a location where that information is automatically and frequently updated may take the burden off the business financial managers and provide the project managers with both more situational awareness and the ability to more easily brief the project to others. However, if this information is not supplied automatically on the backend from work the business financial managers are already doing, it will be looked at as an additional burden and will foster discontent. Figure A-2 shows an overview of the financial results for research conducted during this session.



Figure A-2. Financial overview for research conducted March 3–4 2015.

Action Item

Investigate automatically tracking financial information business financial managers already supply and display it within the portal to provide visibility to project managers about their projects’ expected, planned, and actual spending rates.

ADD VALUE THROUGH CONTENT: RISKS

Summary

Most project managers mentioned a desire to see project risks specified. They expressed concern, however, that after the initial project characterization phase, the risk information would become stale. Despite this observation, they still felt it would be excellent for roll-up to leadership.

Impact

Adding information about product risks will add to the expected value of the portal, but there are concerns about information management. If maintaining risk information requires extra work from the project manager (e.g., having to maintain it in two locations), then it loses value.

Action Item

Investigate surfacing risk information from its current project management tool, and other risk-tracking methods for potential interoperability for visibility by project managers.

Figure A-3 shows initial interface screen shots taken during the research conducted March 3–4 2015.

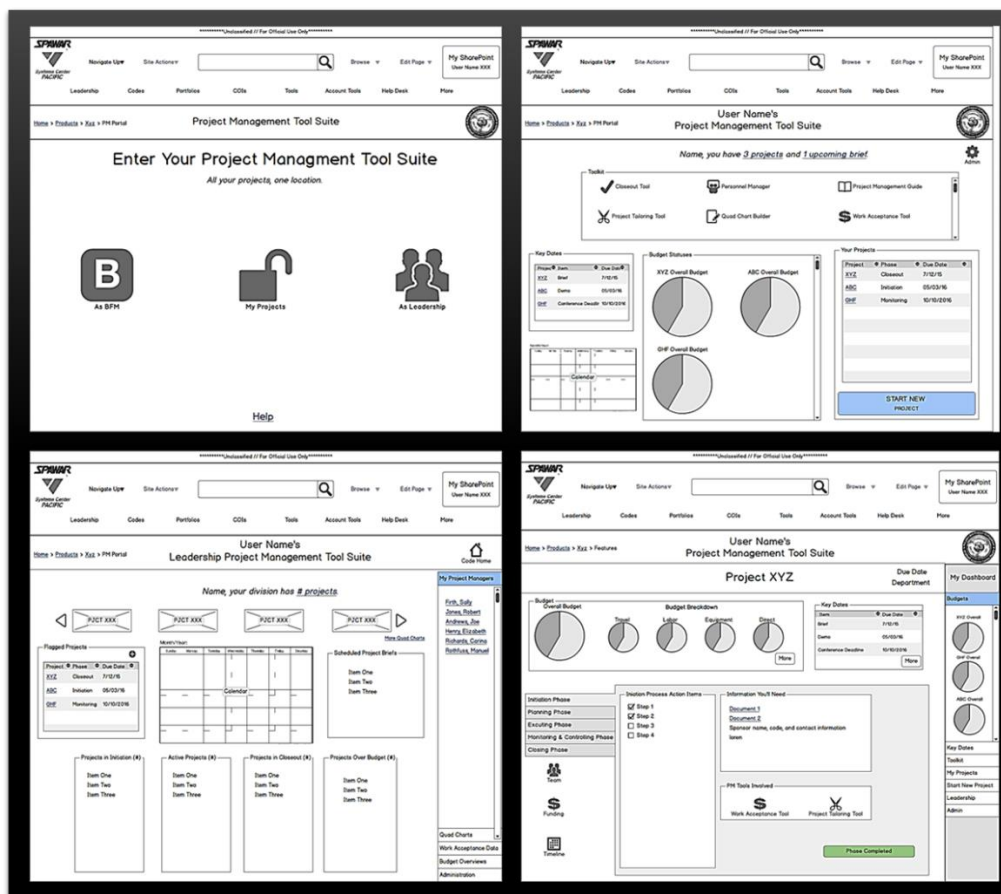


Figure A-3. Initial interface screenshots for research conducted March 3–4 2015.

Figure A-4 shows the pre-interview form used during the research conducted March 3–4 2015.

PM Tools User Centered Design Participant Confirmation

All responses to this form are anonymized, and will not be tied to you in any way.

*** Required**

Please Enter Your Participant Code *
This is the three digit number starting with '3' in your confirmation email.

How long have you been a project manager?
Please count from your first assignment to your most recent.

☐ Less than a year

☐ 1-5 years

☐ 6-10 years

☐ 11-15 years

☐ 16+ years

On average how many projects do you typically manage at the same time?
Please include any projects where you are listed officially as the project manger or IPT lead.

☐ 1

☐ 2-3

☐ 4-5

☐ 6-10

☐ 11+

Of the following, which are your top two sources of information about project managment?

☐ Switchboard

☐ Blog


☐ NSERC (a.k.a. Sharepoint)

☐ Wiki

☐ Colleagues

☐ Other:

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Figure A-4. Pre-interview form for research conducted March 3–4 2015.

Table A-2 shows the session script used during the research conducted March 3–4 2015.

Table A-2. Session script for research conducted March 3–4 2015.

Session Schedule and Script	
Time	Activity
Pre-Session	Basic Questionnaire Information (filled in for Moderator)
Name	
Competency	
Duration of PM	
# of Projects	
Typical Info sources	
First 5 Minutes	Introduction

Table A-3 shows the script interview table used during the research conducted March 3–4 2015.

Table A-3. Script interview table for research conducted March 3–4 2015.

Action and Time Line	Script
Disclaimer	<p>Thank you for making time in your schedule for us!</p> <p>My name is Christian. I'm a Human Factors Engineer with Code 536, and I've been hired by leadership here at the Center to help develop a set of User Requirements to guide and support the development of a suite of tools supporting our project managers.</p> <p>This is Sarah; she'll be taking notes throughout our session.</p> <p>Today, we schedule these 30 minutes of you during which I'm going to ask you some prepared questions and take you through a few sketched out designs of possibilities for a new project management tool. I may ask you to "tell me more" or to give me some examples. I will do this to ensure I fully understand your answers and that I can faithfully represent your needs when I present my findings.</p> <p>The most important part about your participation in this interview is that you consider each question carefully and provide me with as detailed a response as you can.</p> <p>Now, it's important for you to know that you may stop the interview at any point. Similarly, if I ask you a question that you'd rather not answer, simply tell me and I'll move on. It's important that you feel comfortable throughout this process. If you want to stop at any time, just let me know.</p> <p>During this interview, we will be taking notes (and recording) make a record of our session. These notes and recordings are only for our reference. They are simply materials we will use during development of the User Requirements. None of the information you share with us will be attributed to you and will be anonymized in any supporting documentation or presentations we develop as a result of this session.</p> <p>Do you have any questions or concerns about this?</p> <p>Before we begin, do you have any questions about this process?</p> <p>Are you ready to begin?</p>
10 Minutes	Task Walkthrough

Table A-3. Script interview table for research conducted March 3–4 2015 (continued).

Action and Time Line	Script
Introduction	We are going to try what's called "semi-structured interview," which means I have a few questions here I'd like to ask you about, but we can elaborate if we want.
Question 1	So how do you like to manage your projects? Is there anything you do every day or couple of days that helps you stay on top of it?
Question 2	What project information is your go-to status update?
Question 2-B	--->What software do you generally use to track that info?
Question 3	What types of project information do you normally go to _____ or _____ to find?
Question 3-A	--->IF INTERNET: do you have a couple of different search terms you like to try?
Question 3-B	-->IF COLLEAGUES: Do you have a go-to person you like to ask project management questions to?
Question 3-C	----> IF YES: Why them?
Question 4	So now that we've talked about it a bit, how would you define the part of your job that is project management? Maybe describe a little of what it's like to be you handling your projects?
5 minutes	Break and Change Over
10 Minutes	Portal Walkthrough
Introduction	When we do this next part, I want to remind you we're always testing ourselves at the UCD, never you. You are giving us valuable insight into the users we want to help. So be as honest as you can, and try not to be nervous.
Instructions	Now, what I'm going to show you are digital sketches of what the product might look like. These are early designs so some might be incomplete, there will be elements that have fairly good detail, and there will be elements that will be completely missing. If we run into dead ends, or parts that haven't been completed, we won't worry about it, we'll just move on. That's super normal when we test early on like this. I also may ask you to do things we actually haven't created designs for yet. That's fine, we want to hear what you think anyway. So when we get started, remember to just say what you're thinking out loud and give me your gut reaction. Now I'm going to pull up a page, and when I do, I want you to just tell me the first thing you notice. Ready, set, [PULL UP PAGE]
ACTION	Moderator pulls up the landing page (Page A)
Question 2	So what did you notice first?
Question 3	Looking at this page, what do you think you can do with it?
QUESTION 4 Show Me	What would you do here to find that _____ info you mentioned earlier? (Info mentioned in semi structured interview)
ACTION	Moderator follows suggestion and click "my projects" or "as leadership" or talks through their action, then clicks "my projects" or leadership
ACTION	My Projects or Leadership Page opens

Table A-3. Script interview table for research conducted March 3–4 2015 (continued).

Action and Time Line	Script
QUESTION 5 (after click)	Is this what you expected?
Question 6	What caught your eye first?
QUESTION 7	What can you do here?
QUESTION 8	Are you missing anything you usually look for?
QUESTION 10 Show Me	From here, can you show me how you'd find out if project XYZ is close to maxing out their travel budget?
ACTION	Moderator follows suggestion and click "_____" or talks through their action, then clicks "_____"
ACTION	Project Page Opens
QUESTION 11 (after click)	Is this what you expected?
QUESTION 10	Tell me what caught your eye first?
QUESTION 12	What can you do here?

CONCLUSION

Initial user research into the project management portal revealed a strong need for a clear value proposition for the portal. Moving forward, it is critical to intuitively inform the users that the portal is focused on the Center's project management processes, bringing value through co-location of all the tools and resources a project manager will need to accomplish Center-level project management process tasks. Because project managers primarily focus on accomplishing their project needs through performance, finance, and schedule, the burden falls on the portal to deliver rather than demand value and insert itself smoothly into the project manager's existing activities.

Project managers had this to say specific to their focus priority on the Center:

“The last thing I am thinking about is what the Center needs.”

The UCD&E's recommendations derive from this initial user research report and heuristic evaluations of the proposed product's environment, users, and goals. As user research and usability testing progress, recommendations will modify or increase. However, the UCD&E team is confident in recommending a product plan that focuses on only Center processes for project management, while maintaining a consistent and professional user experience. Even though there are opportunities for adding value to the product, (see Findings Section), recommendations related to the primary product goal must be addressed first.

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APPENDIX B

USER RESEARCH TEST RESULTS
APRIL 21–23 2015 AT SSC PACIFIC

APPENDIX B

EXECUTIVE SUMMARY

Usability tests of the low-fidelity wireframes conducted in April 2015 revealed that the interface design and the planned interaction models were highly successful. Users were delighted with the portal's look and feel and felt optimistic that they could perform project management tasks through the interface. The burden remains to design an interface that co-locates all tools and resources required for project management in an easily understood and navigable format.

Participants said the following:

“I like the setup visually.”

“If you had everything [we needed] in there you'd have a lot of happy project managers.”

Future designs, recommendations, and briefings by the User Centered Design and Engineering (UCD&E) team will address the following:

- One-stop shopping: Decrease user workload and frustration while increasing buy-in and participation by providing a single source to complete desired tasks
- Navigation: Provide users with a simple, clear navigation experience
- Plain language: Use clear and consistent terminology to increase recognition, learnability, and user trust
- Support user in task completion: Ensure that the system and interface take the burden for information recall and task recognition off the user
- Increase interface transparency and communication: Tailor the interface to communicate value specific to the user.

The User Center Design and Engineering Branch's recommendations are based on carefully designed usability tests and user research, as well as on-going heuristic evaluations. As user research and testing progresses, recommendations will be shared with the development team and others across the project's organization.

The UCD&E team is confident that its iterative design-test-revise-develop model is continuing to produce many benefits as it helps reveal user expectations and flaws in the product's design. Additionally, with attention to UCD&E's recommendations, the Center's user community ultimately will be well served with a consistent and professional user experience.

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PRIMARY ACTION ITEMS

OVERVIEW

Table B-1 lists issues found during the early stage of portal research and action items moving forward to resolve them. Additional detail about each of these items is in the Findings Section.

Table B-1. Global featured action items uncovered during initial user research.

Topic	Action Item	Priority
One-stop Shopping: Decrease user workload and frustration while increasing buy-in and participation by providing a single source to complete desired tasks	The product will include links to the Work Acceptance Tool (WAT), Project Information and Tracking (PITT), and other Center tools, databases, asset repositories, libraries, etc., and as such will satisfy users' desire for a "one-stop shop." All interactions with these other tools will begin and end with the user returning to the same user experience as each interaction is completed.	High
Navigation: Provide users with a simple clear navigation experience	Increase whitespace and simplicity of the persistent navigation elements. Focus additional testing on difficult navigational tasks, such as returning to "my project" from deep in "Explore". Maintain a clear visual hierarchy between subordinate and superior items.	High
Plain Language: Use clear and consistent terminology to increase recognition, learnability, and user trust	In a future sprint, the UCD&E team will conduct several new studies to evaluate how well language, content, and context support the users' goals and satisfy the Center's objectives. Techniques of card sorting, card storming, A/B testing, and others will be employed to better understand how well the interface and interaction models support the users' needs for comprehension and sense of place. These tests will also provide insight into how well general usability measures are met as users interact with the product.	High
Support User in Task Completion: Ensure that the system and interface take the burden for information recall and task recognition off the user	Ensure the product is cross-pollinating information between all tools, notifying user of changes, actions, and requirements, while always providing clear information about next steps or pending deadlines.	Medium

Table B-1. Global featured action items uncovered during initial user research (continued).

Topic	Action Item	Priority
Increase Interface Transparency and Communication: Tailor the interface to communicate value	Provide information to the users that is easy for them to understand. Rely on logic that follows users' models for the tasks they are performing in a transparent fashion. Reveal help, amplifying information, and alternative workflows whenever necessary.	Medium

Orange = medium priority

Additional action items that surfaced during the user research and heuristic reviews and which the UCD&E team could address through the design process were incorporated into the baseline design. These issues included inconsistent use of language, problems with the navigational structure, and alignment problems with some of the visual elements.

PRODUCT AND DESIGN GOAL

OVERVIEW

This section contains product and design goals used in the portal evaluation study. The goal of this initial product is to provide a single space for SSC Pacific's project managers to access any Center project management content necessary to meet Center requirements. Additionally, users expect the space to provide customized project management assistance based on the characteristics of the projects a project manager is handling.

GOAL OF THIS RESEARCH

This research focused on the initial structural and content requirements for the product. To that end, this research assessed the product's navigation elements, its consistent use of language, how well it supports shared understanding of the portal's underlying concepts, and whether it would enable users to meet the administrative requirements with which project managers must comply.

USERS' INTERPRETATION OF THE PRODUCT'S GOAL

OVERVIEW

This section focuses on users' perception of the portal and their thoughts of how it fits into their current workflow.

Users repeatedly focused on tools and capabilities not in the current scope of the product. These findings are documented as considerations for the following:

- A. Adding value
- B. Ensuring increased user adoption
- C. Increasing leadership's ability to track project data

The UCD&E team will continue to improve the interface language and navigation to properly communicate the capabilities, goals, and value of the interface as currently envisioned. If project manager's expectations for project management and project process support are not realized, however, project managers will lose confidence in the overall product suite and the adoption rate will be low.

INCREASED MANAGEMENT CAPABILITIES: USERS ARE HIGHLY INTERESTED IN A TOOL TO HELP THEM MANAGE PROJECTS BETTER

At the heart of a project manager's work is management. Tools and spaces that allow the manager to more effectively manage their projects are of primary concern in any context. Increased management capabilities are of great importance to users. Increased focus on developing a portal with a fully functioning project dashboard workspace is key to giving project managers a useful tool.

Project managers had this to say:

"I need a supporting product, at the product manager level, more than ... a roll-up tool to be monitored and measured from above."

FACILITATE COLLABORATION AND SHARING: USERS DESIRE THE ABILITY TO SHARE RESOURCES WITH OTHER USERS

Another common thread in the study was the idea of open communication and collaboration between project managers across the Center. Collaboration was valued highly among project managers as a desired feature. Project managers want to view and interact with their peers across the Center using digital open houses, project videos, published quad charts, personnel organizational charts, and shared templates.

Project managers had this to say:

"High-level information should be accessible to everyone at the Center ... to enable collaboration."

Providing project managers with easy, reliable access to channels is highly valued to project managers. They want to easily publish project documents and artifacts supports. They also want tools

in place that support Center-wide cooperation and collaboration efforts. They want a space that allows them to share resources that they believe will improve their overall productivity and increase their ability to share resources.

MINIMIZE USER TASKS: LEVERAGE PROJECT MANAGERS' SCARCE RESOURCES FOR A CLEAR RETURN ON INVESTMENT

A project manager's primary responsibility is first to the sponsor, the project, and the team. Unless a return on investment is evident concerning those priorities, any work product that the manager believes is not delivering a return, is likely to be completed half-heartedly, or not at all.

Project managers had this to say:

“The ROI for the time I put into it is zero, it's negative, actually. I record, I do what they're looking for, but I don't feel that the completion of that adds benefit to how I'm running the project.”

To combat this, return on investment should either be increased, or better communicated to the performer. Alternatively, if possible, the task should be eliminated. Only in extreme cases should it be mandated; unless it is deemed worthy of users' attention, it will likely be regarded as worthless or never completed at all.

USERS

Participant survey questions are shown in Table B-2. This round of research included six 50-minute participant interviews. The study participants were characterized according to the following dimensions:

- Gender: both male and female
- Experience: Less than a year up to 16 plus years
- Number of Concurrent Projects: 1–3
- Education: Bachelors–Doctorate
- Government service: 3–32 years
- Codes: 53, 54, and 56

Table B-2. Participant survey questions concerning project management.

On average, how many projects do you typically manage at the same time?	How often do you delegate project management tasks like filling out the WAT or PIT to another person?	Have you ever completed a project management plan (PMP)?
2–3	¼ of the time	Yes
1	Never	Yes
1	Never	No
2–3	Never	Yes
1	Never	Yes
2–3	¼ of the time	Yes

METHODOLOGIES

OVERVIEW

This section contains three methods that were used for the portal study. This study contains a second series of usability tests that included a pre-session data collection that was conducted both online and through email. Each test session included a semi-structured interview followed by a cognitive walkthrough of several updated wireframes. Each test took approximately 50 minutes. Researchers used the results to evaluate how well wireframe changes supported the needs of the targeted users.

Step 1: Pre-Interview Data Collection

Prior to the user interviews, participants answered some basic questions concerning the amount of time they've been a project manager, the number of projects they typically manage, the frequency they delegate project management tasks, and whether they had ever completed a project management plan. See Figure B-1 for an example of the complete participant survey.

Step 2: Semi-Structured Interview

Each test session began with a semi-structured interview. These interviews included specific scripted questions with the addition of optional probing questions (e.g., "Tell me more...") that allowed participants to elaborate on their answers. These interviews were designed to capture basic information about the participants' project management preferences, basic knowledge of Center processes, project management priorities, project management tools, and general methodologies. See Figure B-2 for an example of the pre-interview protocol used. Figure B-3 **Error! Reference source not found.** shows the session script used during the research conducted April 21–23 2015.

Step 3: Initial Interface Guided Walkthrough

This part of the research was designed to elicit feedback on how well the updated wireframes met the participants' mental models and usage expectations. Additional goals included evaluating the navigational elements, labels, and goal-based content presented in the wireframes and determining the overall usefulness of the interface. This evaluation was conducted in a semi-structured manner, giving the moderator a chance to explore a participant's response off-script to gain a deeper understanding of the participant's remarks.

_____ Participant Code

How long have you been a project manager?

Please count from your first assignment to your most recent

- ☐ Less than a year
- ☐ 1-5 years
- ☐ 6-10 years
- ☐ 11-15 years
- ☐ 16+ years

On average, how many projects do you typically manage at the same time?

Please include any projects where you are listed as the project manager or IPT lead

- ☐ 1
- ☐ 2-3
- ☐ 4-5
- ☐ 6-10
- ☐ 11+

How often do you delegate project management tasks like filling out the WAT or PIT to another person?

- ☐ Always
- ☐ $\frac{3}{4}$ of the Time
- ☐ Half the Time
- ☐ $\frac{1}{4}$ of the Time
- ☐ Never

Have you ever completed a project management plan (PMP)?

- ☐ Yes
- ☐ No
- ☐ I don't know what that is

Figure B-1. Participant survey.

Thank you for making time in your schedule for us!

My name is _____. I'm a Human Factors Engineer in the UCD&E group and we're helping design a suite of tools to help support our project managers.

This is _____ s/he'll be taking notes throughout our session.

Today we'd like to learn more about how well these preliminary designs can support you as a PM or IPT lead. I'll start by asking you some prepared questions and taking you through a few low-fidelity designs. During this time, I'm going to encourage you to think out loud, and verbally walk through your reactions and decision making. I may ask you to "tell me more" or to give me some examples. I will do this to ensure I fully understand your answers and to help me faithfully represent your needs when I present my findings.

The most important part about your participation in this interview is that you consider each question carefully and provide me with as detailed a response as you can.

Now, it's important for you to know that you may stop the interview at any point. Similarly, if I ask you a question that you'd rather not answer, simply tell me and I'll move on. It's important that you feel comfortable throughout this process. If you want to stop at any time, just let me know.

During this interview, we will be taking notes (and recording) in order to make a record of our session. These notes and recordings are only for our reference. They are simply materials we will use as we revise our design and update User Requirements. None of the information you share with us will be attributed to you and will be anonymized in any supporting documentation or presentations we develop as a result of this session.

Do you have any questions or concerns about this?

Before we begin, do you have any questions about this process?

Are you ready to begin?

Figure B-2. Pre-interview protocol.

Figure B-3 shows a general semi-structured interview session script

General Semi-Structured Interview:

To begin, we are going to try what's called "semi-structured interview", which means I have a few questions here I'd like to ask you about, but we can elaborate if we want.

Question 1: So how do you like to manage your projects? Is there anything you do every day or couple of days to help you stay on top of it?

Question 2: How well do you know the project processes the Center expects you to complete?

'---> Where do you normally go to learn about these processes?

Question 3: What tools do you generally use to manage the Center processes for your project?

'---> Where do you normally go to access these tools?

'---> What is your opinion of these tools?

'---> What would make them easier to use? (Prompt, if necessary)

Question 4: So now that we've talked about it a bit, tell me again: how would you define the part of your job that is project management? Maybe describe a little of what it's like to be you handling your projects?

*****5 minute break*****

Walkthrough

For this next part, we will show you one simple concept rendering of a landing page for a project manager Tool; we are interested in understanding how you would use it. Now, what I'm going to show you are digital sketches of what the product might look like. These are early designs so some might be incomplete, there will be elements that have fairly good detail, and there will be elements that will be completely missing.

So when we get started, remember to just keep saying what you're thinking out loud and give me your gut reaction. Just tell me the first thing you notice.

Display Landing Page

Ready, set, [PULL UP PAGE]

Figure B-3. General semi-structured interview session script.

Figures B-4 through B-9 show the customer interface feedback questionnaire used during the research conducted April 21–23 2015.

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User Centered Design & Engineering

Ready, set, [PULL UP PAGE]

So what did you notice first?

Looking at this page, what do you think you can do with it?

Where do you want to go first? What should happen if you click there?

Where do you want to go next? What should happen if you click there?

Etc.

What is missing from this page?

Figure B-4. Customer interface feedback questionnaire (page 1).



Where do you think you would go first to_____?

Choose at random --- (Add a new team member, add a new administrator, request removal from a project)

after click

Is this what you expected?

What caught your eye first?

What can you do here?

Are you missing anything you usually look for?

Figure B-5. Customer interface feedback questionnaire (page 2).



Where do you think you would go first to_____?

Choose at random --- (Add a new team member, add a new administrator, request removal from a project)

after click

Is this what you expected?

What caught your eye first?

What can you do here?

Are you missing anything you usually look for?

Figure B-6. Customer interface feedback questionnaire (page 3).

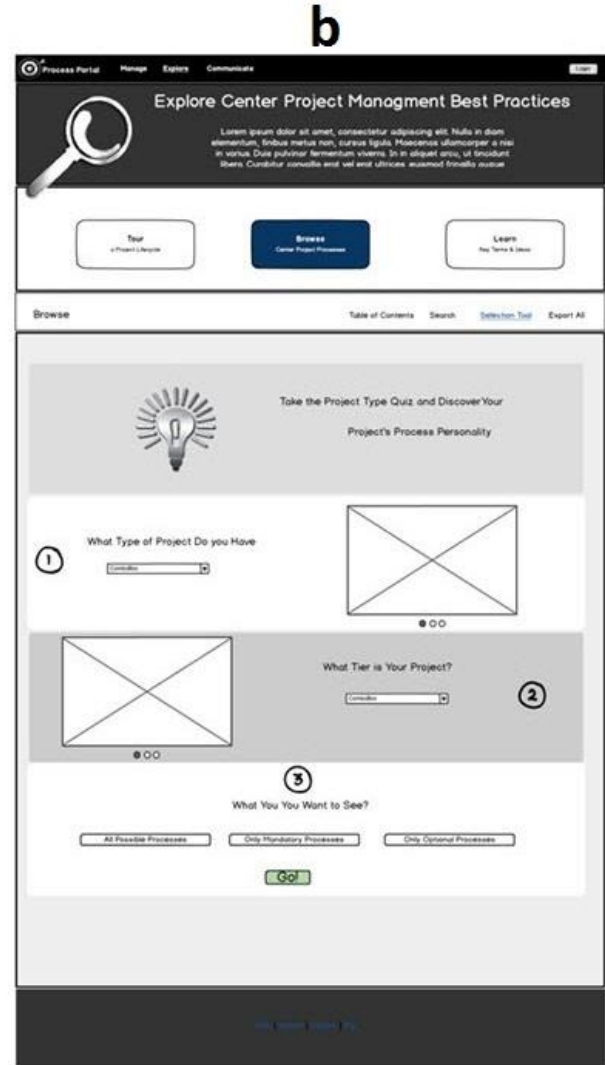
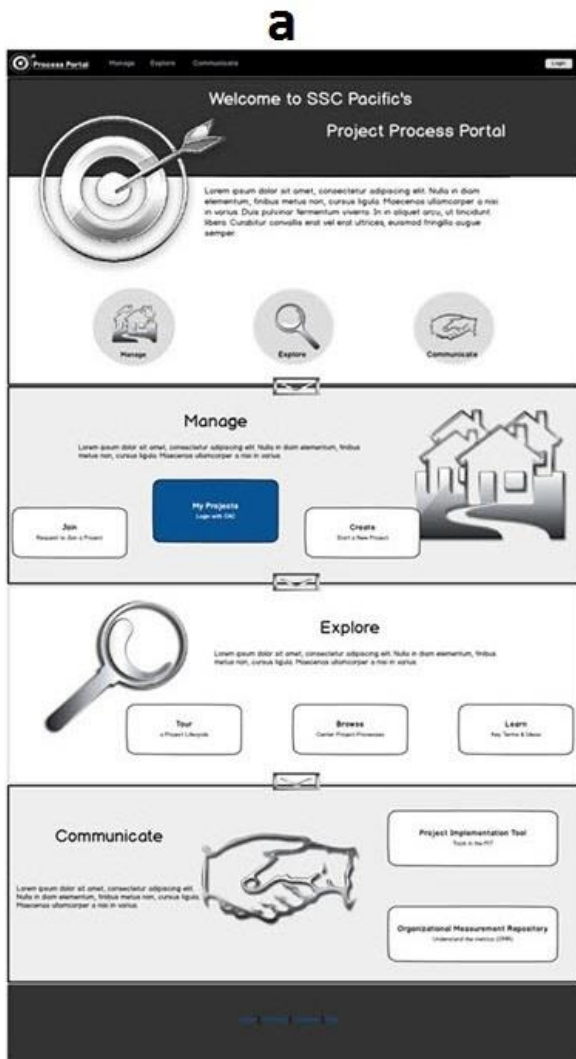


Figure B-7. (a) Landing page; (b) Explore-browse-selection tool (i.e., “sandbox”).

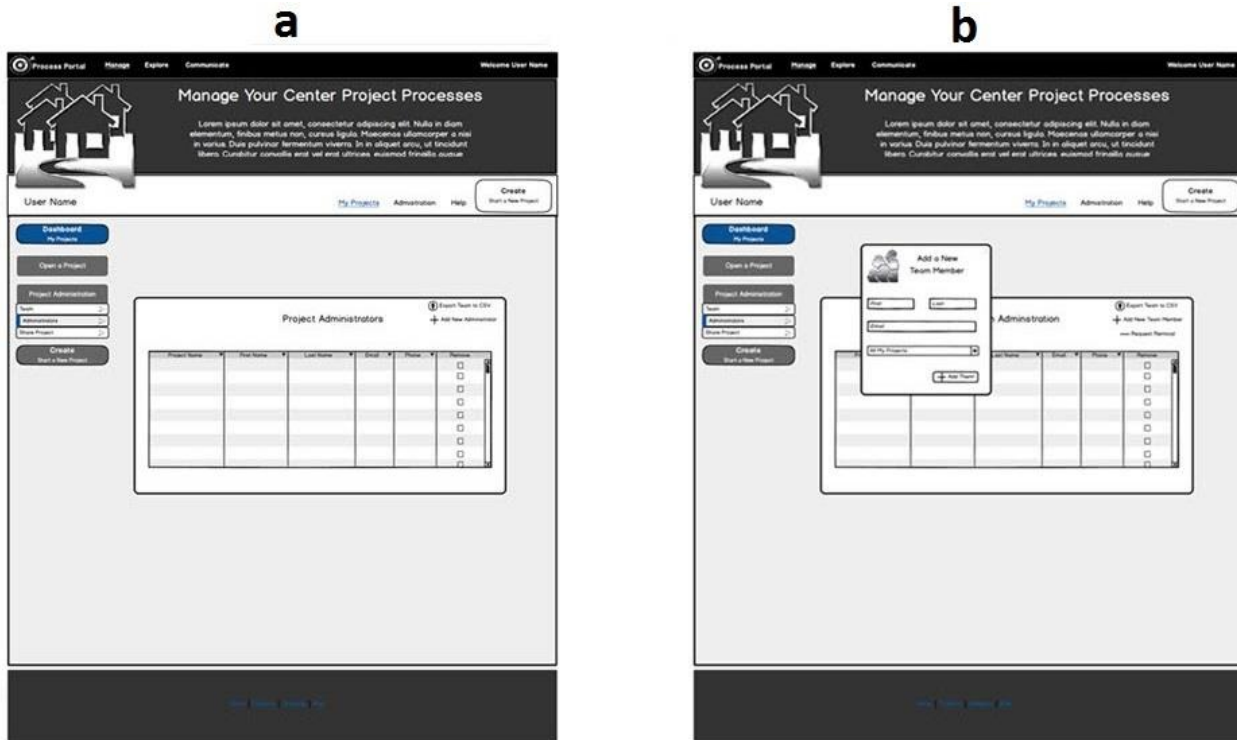


Figure B-8. (a) Project administration; (b) Add a new team member popup.

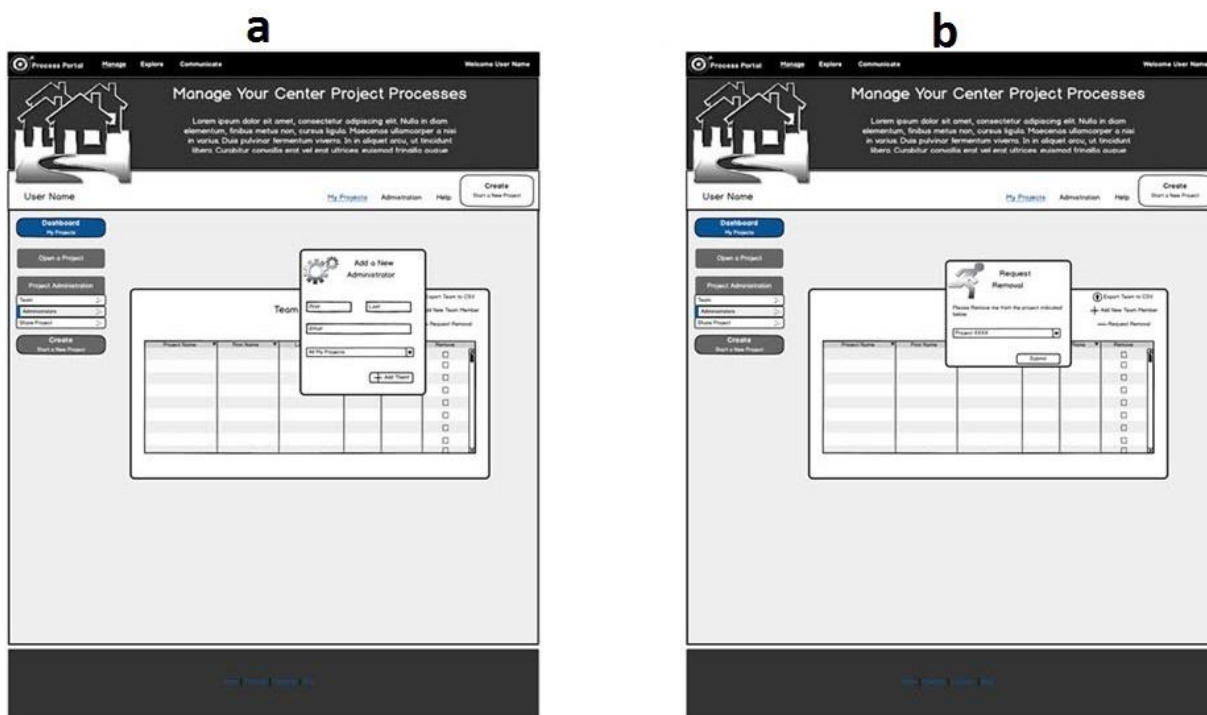


Figure B-9. (a) Add a new administrator popup; (b) request removal format.

FINDINGS

OVERVIEW

This section contains findings found during all parts of the study for this report. In this section, findings are briefly described with a summary of the findings. Comments from portal users specific to the issue are shown, and an action item is given of plans to correct the issue.

The section describes the users' overarching expectations for a future tool or project management space as well as disappointments with current tools and Center-level project management practices. During this study, the UCD&E team identified many separate but related needs that turned up repeatedly in the participants' user stories, both in open interviews and during the task-oriented walkthroughs. Results are grouped into nine categories.

SUMMARY OF FINDINGS

The chart shown in Figure B-10 details eight generalized categories of findings revealed during the April 2015 user studies. Included in this chart is a segment called "Extra Features," which represents user feedback on desired tool capabilities such as directory look up, document repository, Google-styled search, and animated webpage tours.

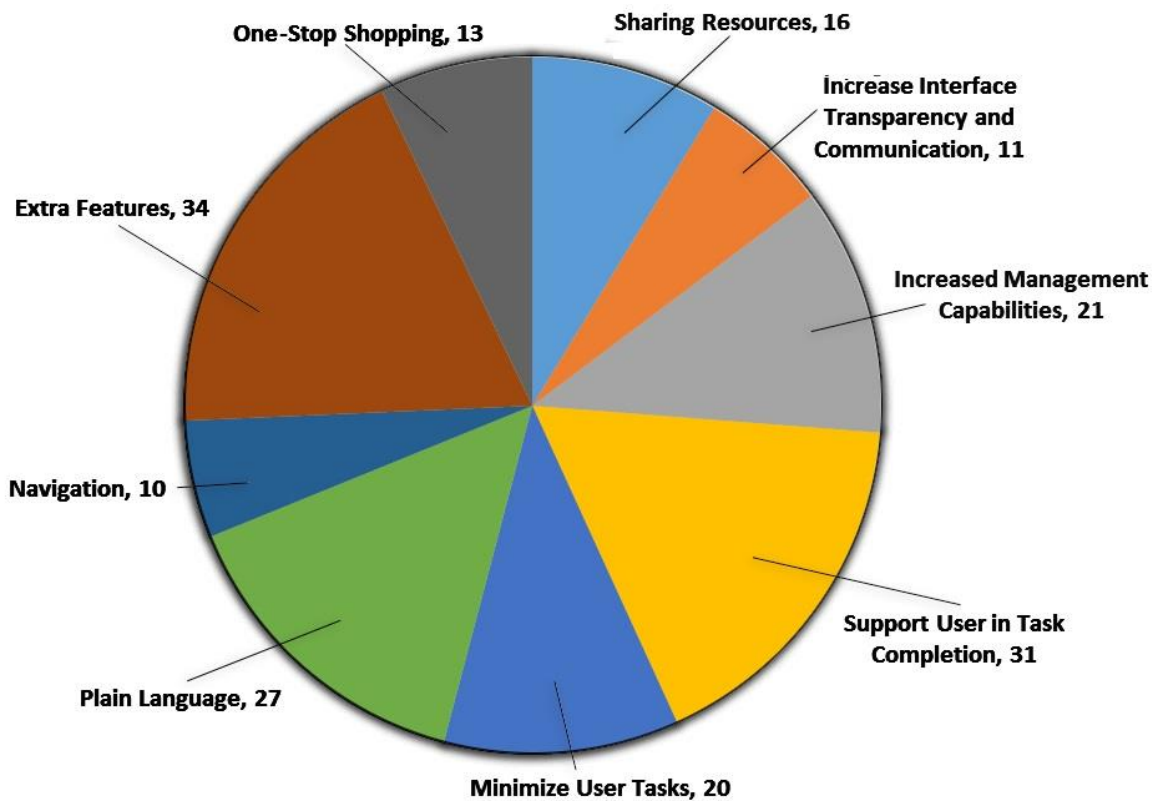


Figure B-10. Number of responses per topic.

ONE-STOP SHOPPING

The goal of one-stop shopping was to decrease user workload and frustration while increasing buy-in and participation by providing a single source to complete desired tasks.

Summary

Users want “one place” to go to manage projects and the users’ associated project management requirements.

Users uniformly and repeatedly expressed their desire to have a single point of entry to access tools and see materials to help them manage their projects and meet Center expectations. They expressed concern about how hard it is to navigate between the different tools that currently exist. They also want help and assurance that they are completing all of the necessary steps correctly.

Participants said the following:

“...I just try to stay off all those dink lists.”

Users currently employ a mixture of tools and resources to execute their project management tasks, including the switchboard, email links, and browser bookmarks to find their way to existing Center tools such as the WAT and the PITT. A surprising finding is that even highly experienced users claim that they don’t feel like they have a thorough knowledge of all of the capabilities and tools that are available to support them. This means that users rely on email reminders and data calls, which put them in a reactive stance, rather than proactively managing processes within a single, multipurpose tool.

Participants said the following:

“That’s one thing I think would really benefit everybody, is if you just had one place you went to you could find all the tools.”

Action Item

The portal needs to include links to the WAT, PITT, and other Center tools, databases, asset repositories, libraries, etc. There needs to be emphasis to satisfy users’ desires for a “one-stop shop” workspace. The user should not have to go to one place for one needed answer and elsewhere for another and then have to combine the solutions in the portal. All interactions with these other tools will begin and end with the user returning to the same user experience as each interaction is completed.

NAVIGATION: PROVIDE USERS WITH A SIMPLE CLEAR NAVIGATION EXPERIENCE

Summary

Simple and clear navigation is critical to user satisfaction, trust, and task completion. If a user cannot successfully navigate around an interface, the user cannot move forward and is likely to abandon a task. During this study the goal-based navigational language implemented for the

“Manage” and “Explore” sections was successful; users could easily locate their project home page, and navigate quickly to the interface from which they can ask to join a project.

Participants said the following:

“Manage, oh, OK this is what we need ... and ‘Request to Join a Project,’ that is exactly what we do in JIRA. I can use that.”

Additional navigational elements are now under redesign, with focus on the reduction of the header when the user has navigated past the landing page, inside the interface. Results showed that the persistent navigation, as currently designed, was overly salient, distracting the user from their primary task. Figure B-11 shows the portal Explore Center Project Management Best Practices screenshot.



Figure B-11. Explore Center Project Management Best Practices screenshot.

Action item

1. Increase whitespace and simplicity of the persistent navigation elements.
2. Focus additional testing on difficult navigational tasks, such as returning to “My Project” from deep in “Explore”.
3. Maintain a clear visual hierarchy between subordinate and superior items.

PLAIN LANGUAGE: USE CLEAR AND CONSISTENT TERMINOLOGY TO INCREASE RECOGNITION, LEARNABILITY, AND USER TRUST

Summary

To successfully use any tool or information space, users need the labels and content to effectively use descriptive language that has a clear purpose, is internally consistent, and aligns with their definitions of terms. Since the project portal will be used by a variety of users with various ranges of project management and Center experience, the UCD&E team is tailoring it to be self-educating and walk-up. The interface’s language cannot make assumptions about the project management experience of the user and must convert specialized terminology into common terms.

When menus, labels, banners, descriptions, and temporal context are simple, consistent, and resonate with users' expectations, all users experience an improved overall user experience. Effective use of language, content, and context also increases users' confidence in comfortably navigating and interacting with the tools and information spaces they use.

Participants said the following:

"I'm not sure of the use of the term 'project' here when I see it."

Example "Communicate"

The UCD&E team is focusing on driving a plain, goal-based language model throughout the interface for proper user learning and recognition. However, one consistent problem faced during tests was reconciling differences in users' mental models for project management tasks. Users liked having a stable link to the Project Implementation Tool on the landing page, and the idea of a collection of tools all based out of the same location. However, the word "Communicate" did not accurately reconcile the users' mental model with the type of actions and goals they would be accomplishing with these tools. Figure B-12 shows an example of communication tools used.

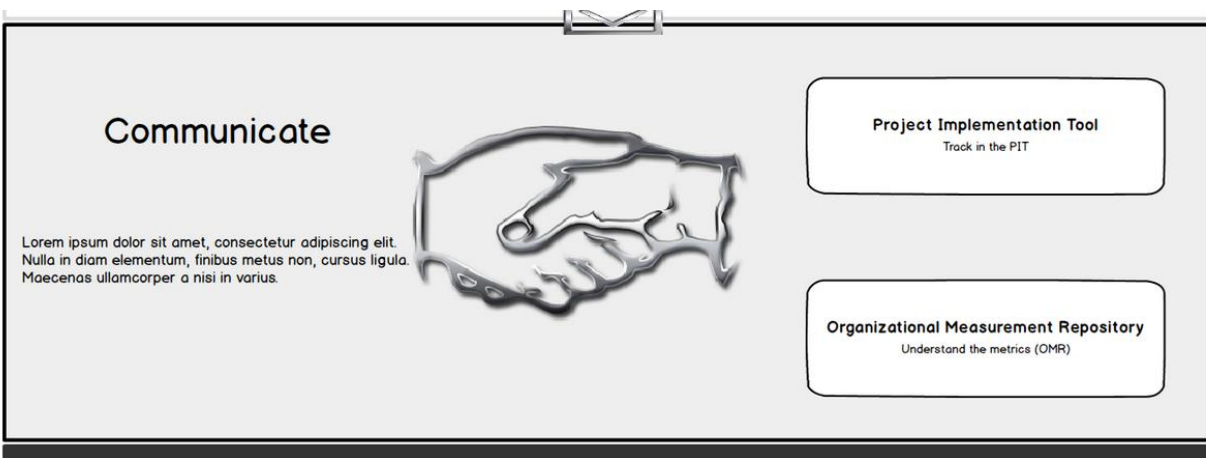


Figure B-12. Communication tools.

The UCD&E team will take steps to find the appropriate language to represent users' mental models on the page while also retaining the value they found in the functionality of this feature.

Action Item

In a future, the UCD&E team will conduct several new studies to evaluate how well language, content, and context support the users' goals and satisfy the Center's objectives. Techniques of card sorting, card storming, A/B testing, and other methods will be employed to better understand how well the interface and interaction models support the users' needs for comprehension and sense of place. These tests will also provide insight into how well general usability measures are met as users interact with the product.

In addition to ensuring that plain language and universal contexts are employed, the UCD&E team will look into drafting an interactive glossary of terms and definitions that is built out over time for reference by the users.

SUPPORT USER IN TASK COMPLETION: ENSURE THAT THE SYSTEM AND THE INTERFACE TAKE THE BURDEN FOR INFORMATION RECALL AND TASK RECOGNITION OFF THE USER

Summary

Users are avoiding completing Center process tasks due to problems such as difficulty in understanding Center requirements, unfunded mandates, unclear or conflicting directions, and defective or problematic technical system. Users wait for a mandate through another individual (like a branch head) to notify them of the next required action.

Participants said the following:

“Honestly, I wait for somebody to ask for something. I have a basic understanding of my requirements ... the project management plan, the completion of the PITT, the characterization tool ... if there are other requirements beyond that, I don’t go looking for them.”

Given their limited resources and the numerous constraints on those resources, project managers will do as few difficult and non-value-added activities as possible. They may entirely give up on an activity when it includes what they believe are insurmountable obstacles, in favor of more productive endeavors.

Action Item

Ensure the product is cross-pollinating information between all tools, notifying users of changes, actions, and requirements. The portal needs to provide clear information about next steps or pending deadlines.

INCREASE INTERFACE TRANSPARENCY AND COMMUNICATION: TAILOR THE INTERFACE TO COMMUNICATE VALUE SPECIFIC TO THE USER

Summary

Center processes that apply differently to different project managers and to different projects need to be communicated through a simple transparent tool.

Research suggests that user adoption may increase if the results of the Process Tailoring Tool (PTT) provided more transparency into the results and how they were determined.

Project managers had this to say:

“I don’t feel like I have a personally tailored ... workbook that tells me what to do.”

Until users feel that the available project management toolset realistically reflects their project’s unique situation, they will not completely trust the results of a “one size fits all” approach.

Demonstrating the trustworthiness of the tailoring tool, and ensuring that it is less painful for users to use will also increase buy-in. This, in turn, will increase the adoption rate and ultimately have a positive effect on users' compliance using this and other tools.

Participants said the following:

“I’ve found it challenging to be clear on exactly what it is I need to do ... Show me the list of what I really, no kidding, truly need to do.”

Action Item

Provide information that is easy for users to understand. Rely on logic that follows users' models for the tasks they are performing and does so in a transparent fashion. Reveal help, amplifying information, and alternative whenever necessary.

CONCLUSION

Overall, the April usability tests of the low-fidelity wireframes revealed that the interface design and the planned interaction models were highly successful. Users were delighted with the look and feel and felt optimistic that they could perform their project management tasks through the interface.

Although the overall design tested very well, flaws associated with the use of plain language and clear context were observed in the “Communication” element of the wireframe. Additionally, continued user research in this second round of usability tests highlighted again the need for a strong and clear value proposition for the product. As noted in a previous report (Final Report of Initial UCD Portal User Research Results, published on March 23, 2015), providing users only with a product focused solely on the Center’s project management processes brings little to no value to targeted users within the project manager and integrated product team lead population segments.

In order to bring value to these critical users, co-locating all of the tools and resources a project manager will need to accomplish his Center-mandated project management process tasks is essential. Because project managers primarily focus on accomplishing their project needs for performance, finance, and schedule, and because they must attend to the priorities of their sponsors first and foremost, the burden falls on the project portal to deliver value, not to demand compliance. The portal’s value can only occur when it inserts itself smoothly into the project manager’s existing activities, rather than existing as another onerous task that must be endured.

Project managers had this to say:

“There was a push to get your stuff into the PITT, and I said, ‘okay, I’ve seen so many emails on it, I’ll try.’ so I went in, and nothing worked. I tried to upload, I tried to download ... this was after I finally found the tool. Anyway, I finally found it, did a bunch of stuff; nothing worked... A couple weeks later, they fixed that, I uploaded a couple documents ... I didn’t see what good that was doing... It’s like an extra activity that seems to have no particular purpose.”

The User-Centered Design and Engineering Branch’s recommendations are based on carefully designed usability tests and user research, as well as on-going heuristic evaluations. As user research and usability testing progress, recommendations will be shared with the development team and others across the project’s organization.

The UCD&E team is confident that its iterative design-test-revise-develop model is continuing to produce many benefits as it helps reveal user expectations and flaws in webpage designs. Additionally, with attention to UCD&E's recommendations, the Center's user community ultimately will be well served with a consistent and professional user experience.

USER-CENTERED DESIGN AND ENGINEERING TEAM CONTACT INFORMATION

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APPENDIX C

USER TEST AND A/B STUDY
MAY–JUNE AT SSC PACIFIC

APPENDIX C

EXECUTIVE SUMMARY

Usability tests of early portal iterations conducted in May 2015 continued to show successes, especially in navigation, interface design, and user task performance. Users expressed delight with the look and feel of the portal and demonstrated that they could perform basic initial project management tasks through the interface with few issues. Going forward, the User-Centered Design and Engineering (UCD&E) Branch will continue to refine these designs, leveraging the lessons learned from this round of testing. The ultimate goal is to improve a portal interface design that co-locates tools and resources required for project management in an easily understood and navigable format.

Participant 327, while downloading a project roster commented:

“This is fun!”

Future designs, recommendations, and briefings by the User-Centered Design & Engineering Team will address the following:

- Removing, de-emphasizing, or reducing distractions caused by the project management body of knowledge (PMBOK) activities and process framework overview
- Improving placement and timeliness of feedback and feed-forward mechanisms
- Using clear and consistent terminology to increase recognition, learnability, and user trust

The UCD&E Branch’s recommendations are based on carefully designed usability tests and user research, as well as ongoing heuristic evaluations. As user research and usability testing progress, recommendations will be shared with the development team and others across the project’s organization.

Participant 523, while using the portal to create a project commented:

“Pretty easy!”

The UCD&E team is confident that its iterative design-test-revise-develop model is continuing to produce many benefits as it helps reveal user expectations and flaws in the product’s design. With attention to UCD&E’s recommendations, the Center’s project portal user community will be well served with a consistent and professional user experience.

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PRIMARY ACTION ITEMS

OVERVIEW

This section contains a listing of action items found during the early stage of portal research. Table C-1 details global or feature action items uncovered during the initial user research. For additional detail about each of these items, see the Findings Section.

Table C-1. Global featured action items uncovered during initial user research.

Topic	Action Item	Priority
Remove, de-emphasize, or reduce distractions caused by the project management body of knowledge (PMBOK) activities and process framework overview	Because of the distracting nature of the process framework and accompanying PMBOK activity map, the UCD&E team suggests removing them from the portal entirely. If the product owners insist on retaining one or the other, we suggest retaining the process framework while de-emphasizing the shapes and colors in a way that shows users that it is a reference diagram, and not an active page navigation element.	High
Improve placement and timeliness of feedback and feed-forward mechanisms	Virtually every participant expressed or otherwise indicated the desire for more comprehensive, timely feedback. Equally important are sufficient feed-forward mechanisms, put in place to help manage users' expectations and improve navigability. Hesitation, insecurity, and excessive scanning for cues are all symptoms of this condition. More feedback is needed, especially upon completion of tasks such as project creation or responding to join requests.	High
Use clear and consistent terminology to increase recognition, learnability, and user trust	Continued improvement in this area is a key element of driving good design. Words such as "administrator", "activities", and "personnel" need to be examined and retested, as necessary.	Medium

Additional action items that surfaced during the user research and heuristic reviews, and which the UCD&E team could address through the design process, were incorporated into the baseline design. These issues included inconsistent use of language, problems with the navigational structure, and alignment problems with some of the visual elements.

PRODUCT AND DESIGN GOAL

OVERVIEW

This section contains product and design goals that were used in the portal evaluation study. The goal of this product is to provide a single space for Space and Naval Warfare Systems Center Pacific's (SSC Pacific) project managers to access any Center project management content necessary to meet Center requirements. Additionally, users expect the space to provide customized project management assistance based on the characteristics of the projects a project manager is handling.

This research focused on the tasks associated with creating a joining, and managing personnel in the project portal. It used task-based analysis, as well as a think-aloud protocol to examine the facility with which users performed a variety of basic, fundamental tasks that they would require of any new project. Additionally, research conducted A/B tests designed to examine users' preferences and abilities to properly differentiate between various methods of displaying and navigating certain design elements within the portal. Elements of navigation, language usage, mental mapping, and interportal communication were tested and recorded to capture successes and failures of the current portal design.

The tasks included as part of the testing protocol were designed to elicit feedback on how well the project portal met the participants' mental models and usage expectations. Additional goals included evaluating the navigational elements, labels, and goal-based content presented in the wireframes, and determining the overall usefulness of the interface.

To the extent that users focused on tools or capabilities not in the current scope of the product, the UCD&E team documented these considerations for future use in adding value and facilitating user adoption of the portal. The UCD&E team will continue to improve the interface language and navigation to properly communicate the capabilities, goals, and value of the interface as currently envisioned. If project manager's expectations for project management and project process support are not realized, then project managers will likely lose confidence in the overall product suite and the adoption rate will likely be low.

MAY USER TESTS

OVERVIEW

This section contains an overview of the background of the participants for the portal study. This research was included 24-minute participant sessions. Table C-2 shows a breakdown of participants by education level and type.

The study participants were characterized according to the following specifications:

- Gender: Both male and female
- Experience: Less than a year up to 16+ years
- Number of Concurrent Projects: 1–10
- Education: At least bachelor's degree ranging to post-doctorate work
- Codes: 42, 52, 53, 56, 59, 71, 72, and 81

Table C-2. Participants by education level and type.

Highest Degree Earned	Area of Study
Bachelor's degree	Computer Science
Bachelor's degree	Electrical Engineering
Master's degree	Business Administration
Bachelor's degree	no information available
Bachelor's degree	Computer Engineering
Master's degree	Systems Engineering
Master's degree	Systems Engineering
Post-graduate degree	Organizational Change and Development
Bachelor's degree	Information Systems
Post-doctoral degree	Neuroscience
Master's degree	Information Systems
Post-doctoral degree	Oceanography

METHODOLOGY

OVERVIEW

This third session of usability testing used four steps to evaluate the portal: pretest data collection, protocol script, task analysis, and a wrap-up. The four steps are detailed in this section. Pre-session data collection was conducted both online and through email. Each test session consisted of focused, task-based analysis following a think-aloud protocol designed to help users share their experiences verbally during the experience. Each test took approximately 40 minutes. These methods helped researchers evaluate how well users could complete the tasks, and provided insight as to common difficulties, distractions, or miscommunications encountered by the participants.

STEP 1: PRETEST DATA COLLECTION

Prior to testing, participants answered some basic questions concerning their experience as a project manager. Participants were asked the number of projects they typically work on, and the number of projects they typically manage (see Figure C-1).

STEP 2: PROTOCOL SCRIPT

Each test session began with one researcher reading the test protocol script and obtaining affirmative consent to the audio and video recording. As a part of this protocol, the researcher discussed the goals for the test session, expectations for the participant, and encouragement to follow a “talk-aloud” protocol, that allowed the participant to talk through the interface so researchers could gain insight into the user experience. As a part of this encouragement, the researcher played an example video of other users employing this protocol. The entire script is shown in Figure C-2.

Figure C-1 shows the survey template used during the research conducted May–June 2015.

_____ Participant Code	_____ SSC-Pacific Code
------------------------	------------------------

Please select your highest degree earned

- ☐ High school
- ☐ Bachelors
- ☐ Post graduate
- ☐ Masters
- ☐ Doctorate
- ☐ Post doctorate

Area of study: _____

How many years have you spent in government service?

_____ years

How long have you been a project manager?

- ☐ Less than 1 year
- ☐ 1–5 years
- ☐ 6–10 years
- ☐ 11–15 years
- ☐ 16 + years

On average, how many projects do you typically manage at the same time? Please include any projects where you are listed as the project manager or IPT Lead

- ☐ 1 project
- ☐ 2–3 projects
- ☐ 4–5 projects
- ☐ 6–10 projects
- ☐ 11 + projects

How often do you delegate project management tasks like filling out the WAT or PIT to another person?

- ☐ Always
- ☐ ¾ of the Time
- ☐ Half of the Time
- ☐ ¼ of the Time
- ☐ Never

Have you ever completed a PMP?

- ☐ Yes
- ☐ No

Figure C-1. Survey template.

Figure C-2 shows the protocol template used during the research conducted May–June 2015.

Thank you for making time in your schedule for us!

My name is _____. I'm a Human Factors Engineer in the UCD&E group and we're helping design a suite of tools to help support our project managers.

This is _____ s/he'll be taking notes throughout our session.

Today we'd like to show you a series of digital sketches of what a new center process tool might look like. These are early designs so some parts of them may be incomplete. There will be elements that have fairly good detail, and there will also be elements that will be completely missing.

During this session, we will be taking notes (and recording) in order to make a record of our session.

These notes and recordings are only for our reference. They are simply materials we will use as we revise our design and update User Requirements. None of the information you share with us will be attributed to you and will be anonymized in any supporting documentation or presentations we develop as a result of this session.

While we look at these pages together, I want to remind you we're always testing designs and processes, never you. You are giving us valuable insights that will allow us to help users like you. So be as detailed and honest as you can, and try not to be nervous. Remember this is not a test of your abilities, but a test of the page design. If something is not clear, that's OUR fault.

What we are going to do today is called a "think-aloud protocol". What we will do is give you a scenario similar to something that might actually happen in real life, with a list of activities to perform. We would like you to complete the activities as best as you can with the interface we are looking at. During this time, we need you to think aloud and verbally walk us through your reactions and decision-making. I need to record these reactions to ensure I fully understand your answers and to help me faithfully represent your needs when we present our findings. Just try to say everything that comes into your head, your reactions, your insights, what you're looking for... anything and everything helps.

To help you better understand what we need from you, let's watch a brief video to see how another user did this successfully.

****Show video****

The most important part about your participation in this session is that you consider each task carefully and provide me with as much detail as you can.

Finally, it's important for you to know that you may stop this session at any point. Similarly, if I ask you to do something you cannot do, for any reason, simply tell me and I'll move on. It's important that you feel comfortable throughout this process. If you want to stop at any time, just let me know.

Before we begin, do you have any questions or concerns about this process?

Are you ready to begin?

Figure C-2. Protocol template.

STEP 3: TASK ANALYSIS

Before the test, each participant, identified only by a participant ID number, was randomly assigned an order in which to complete two tasks.

Two scenario cards were used in the task analysis test:

1. Task CPX “Stormcloud” scenario was a task in which the participant was asked to start a project and add personnel to the project while assigning roles. The CPX Stormcloud scenario card used for this test is shown in Figure C-3. On the CPX Stormcloud scenario card, the portal test participant was told to perform as a project manager for a hypothetical project called “Stormcloud”. The participant was asked to perform two tasks: (1) create an entry for a new management project, Stormcloud in the portal software, and (2) enter the name of one person to work with them on the Stormcloud project. At the beginning of the CPX task, the first scenario card CPX Stormcloud was read aloud.

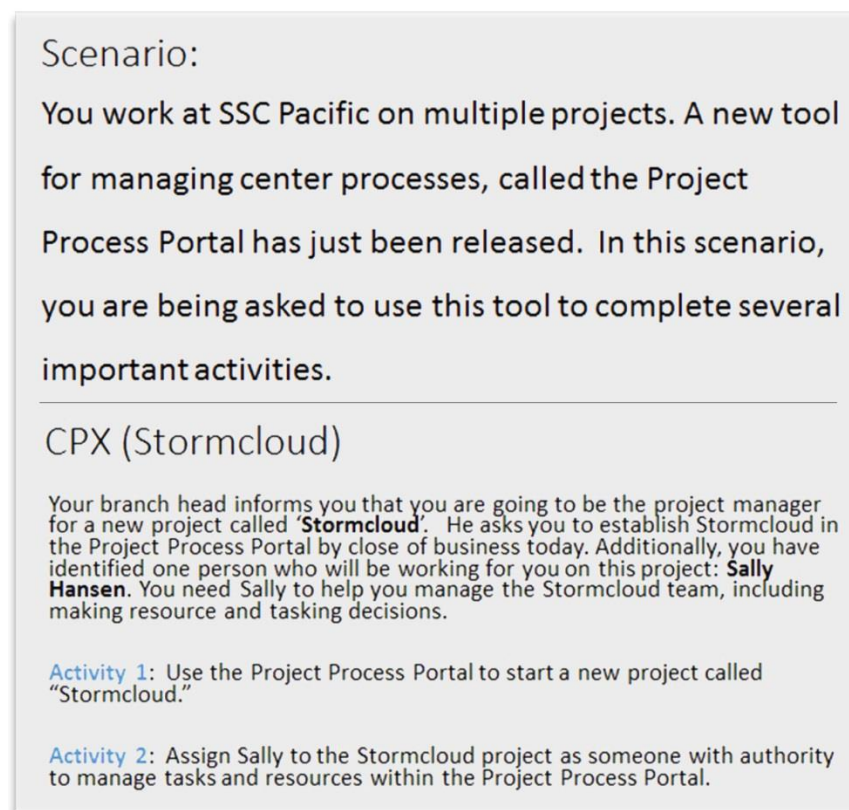


Figure C-3. Task CPX Stormcloud Scenario card.

2. The other task, JPIY, shown in Figure C-4, and MJPY, shown in Figure C-5, were given the project name “Viceroy”. These scenario cards asked the participant to join a project, either through an invitation, or solicitation of an invitation. The participant was tasked to find and check off some basic information about the project’s status and download a roster of the personnel associated with the project using the portal software. The assignment of JPIY or MJPY was random.

JPIY (Viceroy)

Richard Burl, your new project manager, has just sent you an email:

Activity 1: Using the link in the email, accept the invitation to become a team member on project Viceroy.

Activity 2: Determine whether or not the PM has finished submitting the work acceptance package for Viceroy.

Activity 3: Create a distribution list for Viceroy by downloading a roster of everyone on the project.

Figure C-4. Task JPIY Viceroy Scenario card.

MJPY (Viceroy)

Your branch head asks you to provide support to project manager **Richard Burl** on the **Viceroy** project. She asks that you request access to the project information using the the new Project Process Portal. She gives you a link to the portal.

Activity 1: Using the Project Process Portal, request access to the Viceroy Project.

Activity 2: Determine whether or not the PM has finished submitting the work acceptance package for Viceroy.

Activity 3: Create a distribution list for Viceroy by downloading a roster of everyone on the project.

Figure C-5. Task MJPY Viceroy Scenario card.

After each task was completed, the participant relayed his/her completion status to the researcher and the participant was evaluated on their success in completing the tasks.

STEP 4: WRAP-UP

Once the tasks were completed, users were permitted to explore the interface at their own pace, if desired. The research team also answered questions about the goals of the research, the state of the tool, and various other curiosities presented by users. Researchers then stopped the recordings, dismissed the participant, and proceeded to use individual and group notes to capture the lessons learned during the session for later use in meetings and reports.

FINDINGS

OVERVIEW

This section contains findings found during testing for this report. The section describes users' overarching expectations for a future tool or project management space, and disappointments with current tools and Center-level project management practices. During this study, the UCD&E team identified many separate but related needs that turned up repeatedly in the participants' user stories, both in open interviews and during the task-oriented walkthroughs. The results are grouped into categories for further discussion.

SUCCESSSES

A major positive feature of the portal is its simplicity. Numerous participants commented about the clean, uncluttered look of the portal, indicating preference for this style of interface over the cluttered look and feel of many other work tools. In particular, the portal received high marks for its straightforward navigation and learnability.

Participants said the following about the portal interface:

“Nice, simple, easy to understand.”

“It feels clean, it feels pretty straightforward ... There's not too many things on the page, there's not too many things that I can click on ... the layout's pretty good.”

“I'm just hoping that by helping and taking a little bit of time that maybe we could get some really good software so we can all do our jobs a lot faster.”

The portal's current front-page design leverages a clean-look design and judicious use of whitespace that users favored in previous interviews. Those characteristics, coupled with sensible navigation and good communication lead to a highly valuable, friendly user experience. One user commented that the navigation seemed “too easy,” unlike his previous experiences at the Center.

Participants said the following about other experience with other software interfaces:

“It's so important, 'cause there's so many hundreds of us that are going to rely on this, that we want it to be user friendly. Currently today, the software, in my opinion at SPAWAR, is not very user friendly ... It's just painful ... It's such a waste of time, times hundreds or thousands of people ... I'm just hoping we can save a little time here.”

FAILURES

The biggest failure of the current design seems to be the confusing way visual presentation of the PMBOK activity map and process framework data to users. Even without asking the participants to comment on them directly, feedback from users is uniformly negative towards these elements.

Participants said the following about the presentation in the portal software of the PMBOK activity map and process framework data to users:

“This is much more complicated. [audible *oof*] Initially it’s a lot of information up front.”

“I’m not sure what all this stuff is at the bottom, all these bars ... [laughs] but it looks like a lot of information.”

“They give me this process flow that I never—these are on every one of these tools and I never read them ‘cause ... I don’t know what they’re trying to tell me, so I just ignore them.”

Because of the distracting nature of the process framework and accompanying PMBOK activity map, the UCD&E team suggests removing them from the portal. If the product owners insist on retaining one or the other, we suggest retaining the process framework, while de-emphasizing the shapes and colors to show users that it is a reference diagram, and not an active page navigation element.

Alternatively, placing the diagrams in a more inconspicuous area of the portal is acceptable. In future discussions with the Process Architecture Improvement Project (PAIP) team, we will offer suggestions that touch on each of these suggestions.

One participant said the following about the presentation in the portal software of the PMBOK activity map and process framework data.

“I know you guys are held by the PM guide, or whatever, but this whole [process framework and PMBOK activity map] concept is just, it’s really pathetic. We don’t ... This is not how it works [in real life].”

THREE USER TYPES

There are three types of user types for the portal software that are discussed in this section. Observing the task paths and feedback acquired, it seemed as though each of the users fell into one of three loosely defined categories.

1. Type One users: The first category is that of older software users. These users learned computer skills at a later age. They do not scroll through interfaces, they expect things to be immediately apparent. There is additionally an expectation for information to be presented in links or documents with clear hyperlinks, well placed throughout the interface. Users doesn’t expect a rich user experience. They want very little from the portal website. They want to get in, find what is needed, and to get out of the portal. Because the user doesn’t expect much from the experience, working hard to get what needs to be done in the software is not an option. “Give me the information, and let me get on my way” is the mantra of these users. This approach tends to be the classical way senior personnel generally interact with the portal and computers.

One experienced said the following about the ease of use of the portal software:

“It would be nice if I had a one-stop-shop, whereby I put the information in once, and it fills out all the tools that the Center requires instead of me having to go to each one, so hopefully something like this would be able to enter it once and whatever the upper management wants to slice and dice, it’s a one-time-shop—I don’t want to have to do multiple things as I’m doing right now.”

2. Type two users: These users are mid-late-career professionals. They are an experienced user type and skew on the older side of test participants. They do not have as much computer experience as the more experienced Type One users. They have, however, seen a lot of different programs, and a lot of turmoil throughout their career working with different software solutions. These users inherently don’t trust the portal website. Because of this distrust, the users constantly need reassurance and proactive feedback to ensure that what they are expecting the software portal to do is exactly what they are experiencing, and vice versa. Because these type of users have experienced a lot of software issues in older systems, they expect problems to occur with any new software they use. They are very patient with the software when issues do occur. They wait because of the (expected) difficulties. If the software doesn’t immediately do what the users expect it to do, they will wait (often unnecessarily) before trying something else. These users also prefer as little interaction with the interface as possible.

An experienced user type two had this to say the portal software and having too many options in one place.

“That’s the biggest frustration. If we want to go to another tool, then let’s go to another tool, let’s not add another tool and have us do them all!”

3. Younger computer users: These users have typically “grown up” using computers. It is second nature for these users to scroll a lot, searching and scanning for cues contained in the interface. For these users, immediate feedback is paramount. These users have little patience for slow or unreliable interfaces. They are confident in their ability to navigate and intuitively pick up on navigation cues. They expect high performance and advanced capabilities from the portal. These users will test the limits of the portal navigation capabilities. As long as these conventions are sound and properly implemented, these users will take advantage of them better than most. These users expect to accomplish a lot within the portal, but are against spending too much time to get where they want to be in the portal to get the portal to do what they need it to do.

Younger users had this to say:

“Make the site powerful and quick to respond to commands.” If this is done, we feel the user will appreciate the experience.

One younger user had this to say regarding having more capabilities in the portal software:

“Having more capabilities would make me like the tool more because it gives me something I could maybe use on a day-to-day basis, rather than a tool that I just go into every three months to just click “go” so everyone up the chain is happy.”

“I would want to be able to go into there and actually assign [supervisors, branch heads, etc.] the privilege of viewing the details ... automatically generate a report ... that’s such a great time saver.”

Normally, it can be a bit of a challenge to design a site that caters equally well to all of these three types of users, as well as others who may not neatly fit into these categories. The common threads of simplicity, straightforward navigation, and increased real-time feedback, however will go a long ways towards accomplishing this goal.

OTHER NOTES

Users had some general confusion with the top navigation links and the left-hand navigation links in the project dashboard page. Some of this confusion was due to some inactive links; these kinds of issues will naturally lessen as the portal is developed further. It is important to maintain a separation in functionality, except as specifically called out in the design specs (“Create” button, etc.). We will work closely with the development team to iron out these issues. When successfully implemented, the portal software will be refreshing and delightful for users.

One portal software participant said the following when trying to locate the project management tracking (PMT)# function:

“I think this is awesome how it has the project name and PMT# in the top left [of the dashboard] so you always know [where you are in the portal], especially when you’re in multiple projects, so you always know you’re in the right one. I think that’s cool.”

Within the project portal, the word “administrator” has different meanings in different contexts. In future designs, it will be important to differentiate between system administrator, site administrator, project administrator, and/or team administrator, as needed.

An additional item discovered as a part of these user tests concerns the process of navigating to, and using the project team roster of personnel. There is a strong preference for users to navigate to a project-specific roster only through the project page itself. By requiring users to first access a multi-project personnel roster then filter that to obtain a project-specific roster, the users’ mental models of how the interface should handle this situation was violated, leading to confusion and distrust in the interface to give the correct output. As originally designed, there should be a project-specific roster link from within the project dashboard page; this button is currently present, but not yet active. Once this is fixed, the UCD&E team suggests re-testing this item. More than half of the participants tested had significant issues with its functionality.

Across the board, virtually every participant expressed or otherwise indicated the desire for more comprehensive, timely feedback. Equally important are sufficient feed-forward mechanisms, put in

place to help manage users' expectations and improve navigability. Hesitation, insecurity, and excessive scanning for cues are all symptoms of this condition. More feedback is needed, especially upon completion of tasks such as project creation or responding to join requests.

One portal software participant said the following:

“The feedback’s good ... I know who [the request is] sent to. I like that the feedback is there, in case you click on the wrong one.”

A/B STUDY

OVERVIEW

This section contains findings found during A/B study comparisons done for this report. For this study, the UCD&E team used an eight-question survey to compare four competing design options, distributed to study participants by the online polling tool, SurveyMonkey®. The purpose of the survey was to generate feedback about which of the four approaches to the secondary navigation users deemed “easier to use.” The UCD&E team identified four potential design configurations, mocked them up and paired them for experiments. The orange circled functions shown in Figure C-6 portray the same function displayed in different configurations.

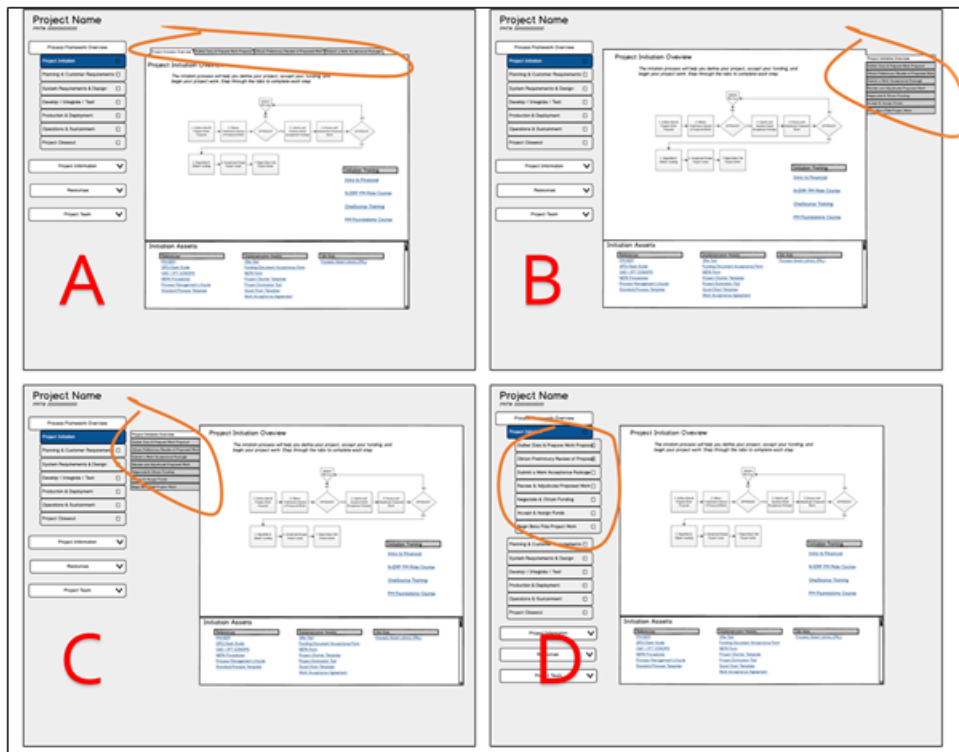


Figure C-6. Four potential design configurations, (mocked up for comparison).

Six pairs of screenshots were randomly displayed to each participant (AB, AC, AD, BC, BD, and CD). Users were asked to choose their favorite from two displayed options. Users selected their favorites among all six pairs presented.

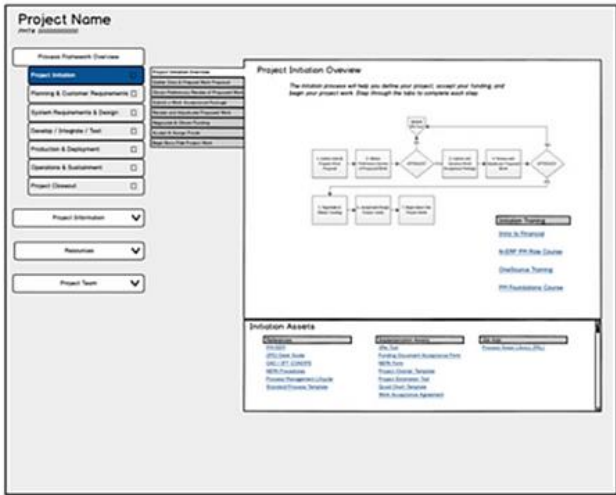
Paired screenshots are shown in Figure C-7, where the user was given a choice of two screen configurations and asked to choose which was easier to use.

Project Management Tool Suite- Display Options

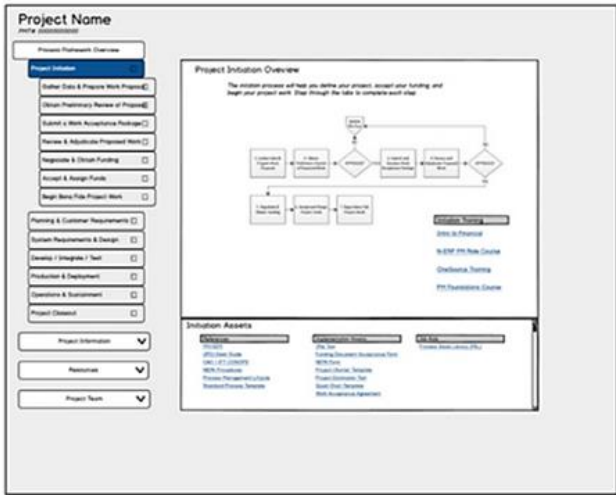
*** 1. Is X or Y easier to use?**

☐ Image X ☐ Image Y

X



Y



Prev
Next

Figure C-7. Paired screenshots.

The questionnaire continued by asking basic demographic questions for classification purposes. The questionnaire is shown in Figure C-8.

Figure C-8. Demographics and form submission.

The polling tool required users to make a selection between the pairs shown, but did not require answers to the demographic questions so their answers could be counted in the overall totals.

The UCD&E team advertised this survey to participants through the Fusion[®] website, by members of the Project Manager Council, and by word-of-mouth in the various branches to reach the widest audience possible with the least overhead.

The UCD&E team wanted to keep the cost of this study low for two reasons:

1. The team opted to add this study to the scope of work agreed to help address a complex issue that needed solving; the cost of recruiting, vetting, and assigning participants to this study was not included in the original budget.
2. The team wanted to provide a feedback mechanism to the broadest population possible without incurring excessive costs, yet ensuring open opportunity for more members of the Center at large to contribute feedback to the overall PAIP project.

RESPONSE AND DEMOGRAPHICS

Response Rate: Seventy-one people completed the entire survey; sixty-nine answered the demographics portion, volunteering their codes participation to count distribution. Of those responses, Departments 5.0, 6.0, 7.0, 8.0 and Code H were all represented, with Department 5.0 comprising the majority (76%) of participants. (See the chart provided in Figure C-9).

Although the survey asked participants to identify their department, the mix of responses ranged from department codes, to competency codes, to 5-digit branch codes. For consistency, we refer to the participants' reports of the work unit they are associated with as "competency codes."

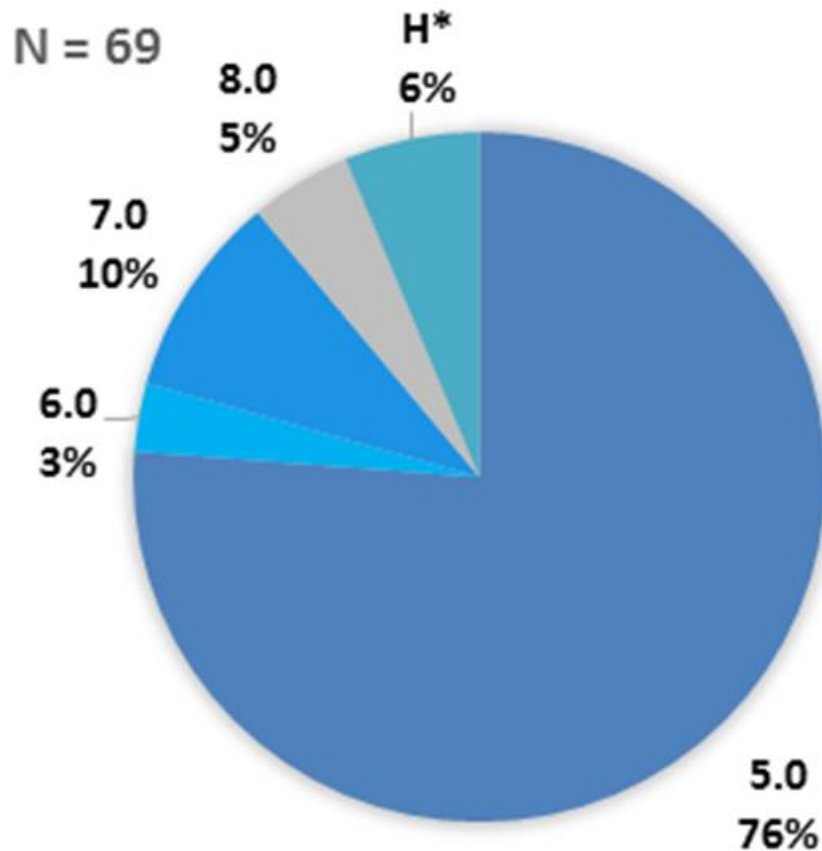


Figure C-9. Participant reports by competency code (percentage).

Sixty-three of the 71 participants responded to this survey with demographic information about their project management experience. Of those, 70% had some degree of project management experience, with the greatest number of participants without experience coming from Department 5.0.

Figures C-10 and C-11 detail project management experience of portal users for participants in two ways. Figure 12 provides an comparison of participants' project management experience that participated in the portal study shown in percentages.

Participant Experience in Project Management

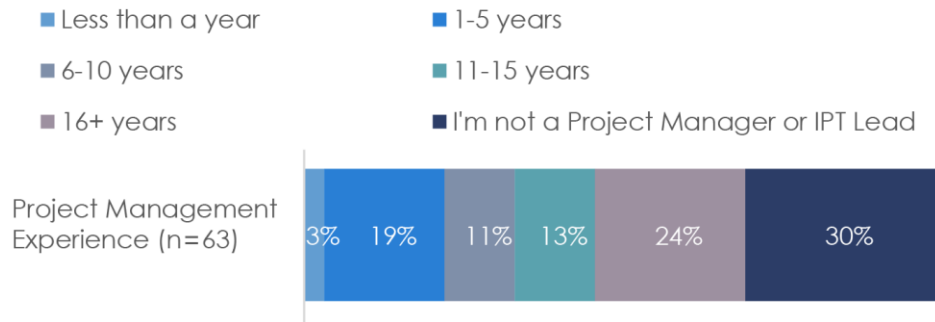


Figure C-10. Participant project management experience by percentage.

Figure C-11 details participants' project management experience by competency code.

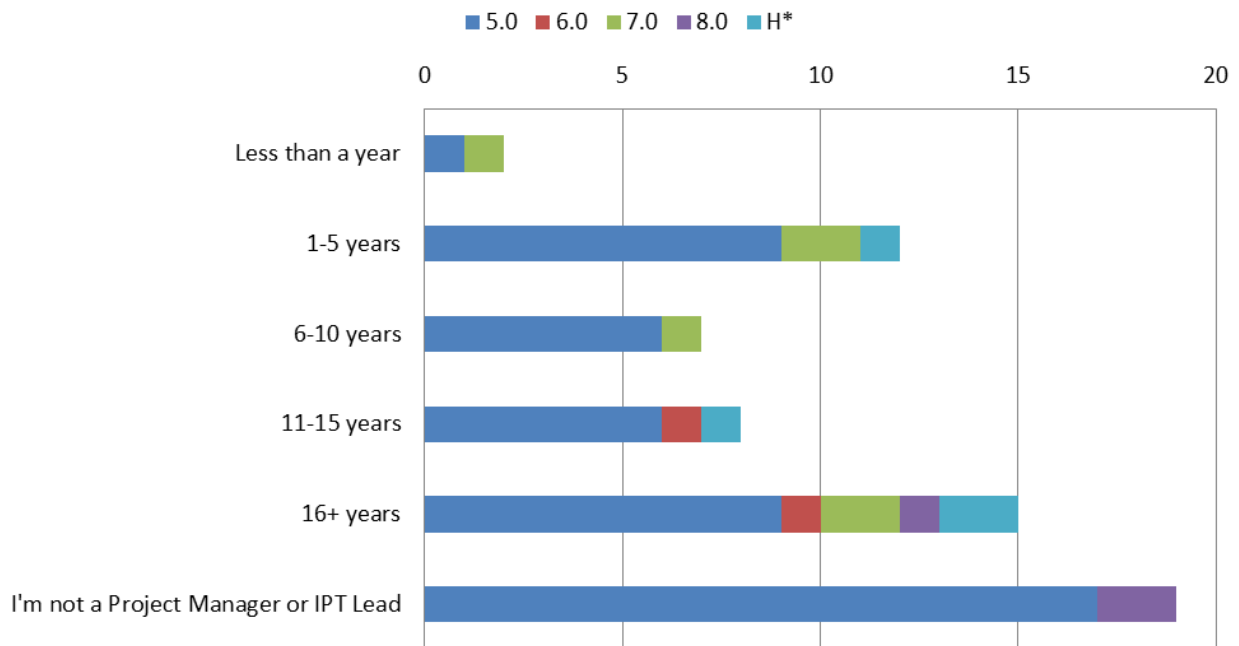


Figure C-11. Project management experience by competency code.

COMPARISONS

The UCD&E team performed a trend analysis of portal test participants looking for patterns in the screen configuration designs. Figure C-12 shows portal users' design selections preference ratings for A, B, C, and D alternative screen designs. Figure C-12 shows the two most preferred designs were A and D, consistently over B and C. Each design configuration presented a choice of two portal screen design configurations. Four design configurations were presented. Figure C-12 shows the popularity of design configurations by percent age based on portal users' choices.

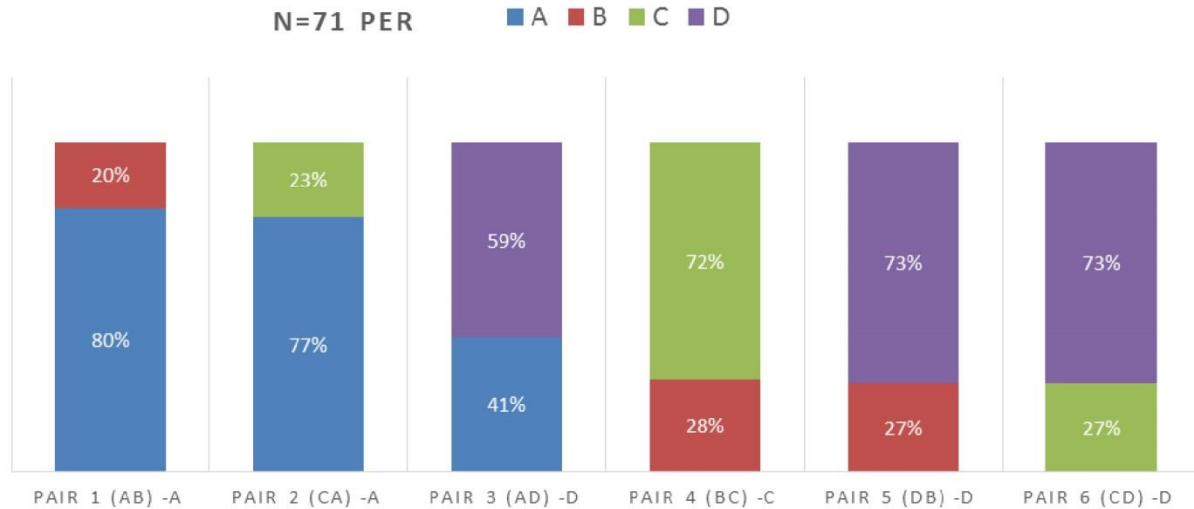


Figure C-12. Software configuration reference data individual comparisons.

Design configuration A = blue
Design configuration B = red
Design configuration Z = green
Design configuration D = purple

Figure C-13, highlights PAIR 3 (A/D) -D which was favored at 59% over PAIR 1 (AB) -A at 41% as the preferred configuration.

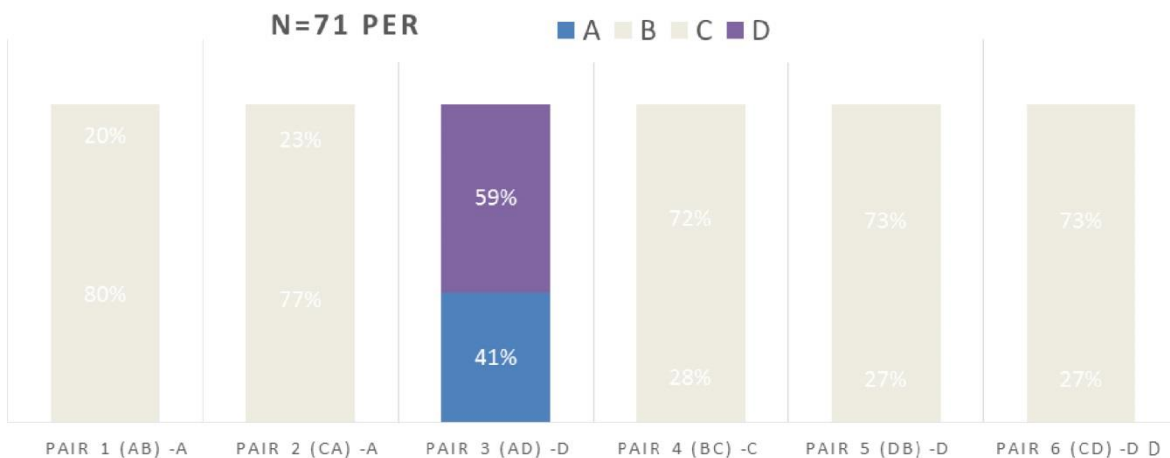


Figure C-13. Preference data individual comparisons focus on PAIR 3 (AD) - D.

Design configuration A = blue

Design configuration D = purple

Least preferred design configurations = muted gray

The UCD&E team performed a heuristic evaluation of the designs and concluded that design A was likely insufficient to support the textual density of the content. The results of the survey supported this conclusion, coinciding with the executed design, allowing for unfettered presentation of the textual content. As a result of the participant input, the project activity navigation scheme was redesigned. The redesign of the navigation menu improved access and ease of use of the navigation menu. The navigation menu that was formerly on the upper left of the portal screen is now displayed in the center workspace as shown in Figure C-14.

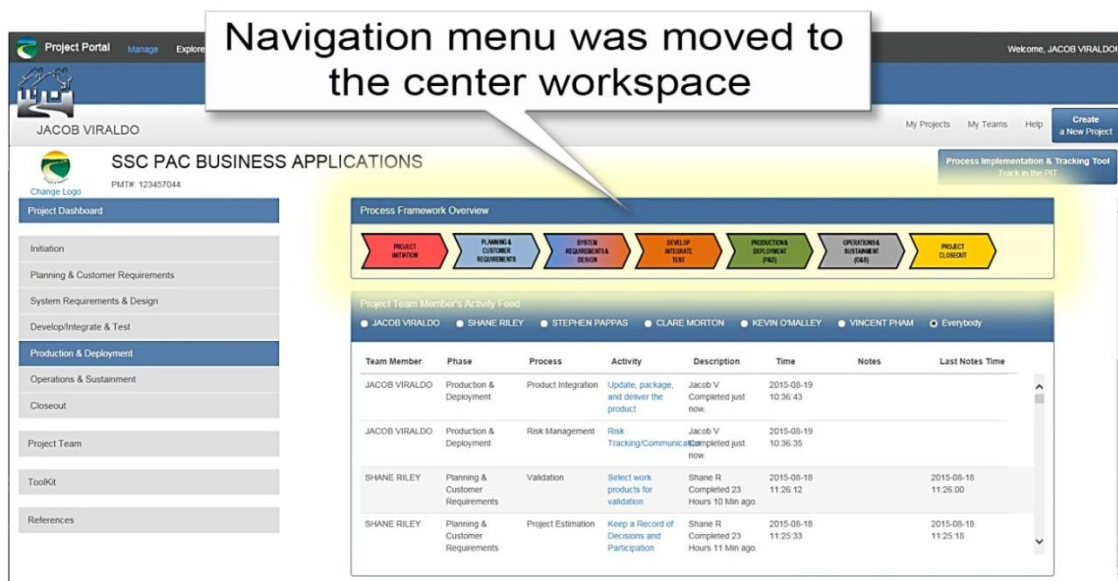


Figure C-14. Project activity navigation scheme (latest design).

CONCLUSION

Usability tests of early portal iterations conducted in May 2015 continued to show successes, especially in navigation, interface design, and user task performance. Users expressed delight with the look and feel of the portal and demonstrated that they could perform basic initial project management tasks through the interface with few issues. Going forward, the UCD&E Branch will continue to refine these designs, leveraging the lessons learned from this round of testing. The ultimate goal is to improve an interface design that co-locates tools and resources required for project management in an easily navigable format.

Participants said the following about the downloading the roster:

“This is fun!”

Future designs, recommendations, and briefings by the User-Centered Design & Engineering Team will address the following:

- Removing, de-emphasizing, or reducing distractions caused by PMBOK Activities and Process Framework Overview
- Improving placement and timeliness of feedback and feed-forward mechanisms
- Using clear and consistent terminology to increase recognition, learnability, and user trust

The User-Center Design & Engineering Branch’s recommendations are based on carefully designed usability tests and user research, as well as ongoing heuristic evaluations. As user research and usability testing progress, recommendations will be shared with the development team and others across the project’s organization.

Participants said the following about using the portal to create a project:

“Pretty easy!”

The UCD&E team is confident that its iterative design-test-revise-develop model is continuing to produce many benefits as it helps reveal user expectations and flaws in the product’s design. Additionally, with attention to UCD&E’s recommendations, the Center’s Project Portal User Community will ultimately be well served with a consistent and professional user experience.

USER-CENTERED DESIGN & ENGINEERING TEAM CONTACT INFORMATION

- | | |
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APPENDIX D

USER RESEARCH TEST RESULTS OCTOBER 1, 2015, AT SSC PACIFIC

APPENDIX D

EXECUTIVE SUMMARY

As part of the effort in supporting the Space and Naval Warfare Systems Center Pacific project portal, the User-Centered Design and Engineering (UCD&E) team conducted three rounds of rapid user testing to quickly and efficiently identify and correct the major interface impediments and system bugs in the existing design. As part of this action, several key interface elements and system bugs were identified, documented, and corrected. This report discusses those bugs.

The most significant issues to address and correct include:

1. Shortening computer wait times between tasks
2. Correcting issues with the personnel lookup tool
3. Debugging and implementing fixes for several bugs discovered during testing

Most of elements the UCD&E team tested, beyond issues found, are documented in this test report. Tested issues tested extremely well. Portal users successfully completed assigned tasks. Any issues found during testing are in this report. Three rounds of testing proved sufficient to capture most of users' issues. The test pace was fast enough to prevent unnecessary work for the development team. The pace was moderate enough to allow updates to be added for smaller groups.

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INTRODUCTION

PREVIOUS PORTAL TEST LESSONS LEARNED

The project portal user design is supported by the user centered design and engineering User-Centered Design and Engineering (UCD&E) team at Space and Naval Warfare Systems Center (SSC Pacific). The team previously supported the software development team by conducting extensive user testing sessions. These sessions were conducted April–May, 2015. The sessions provided a wealth of information to researchers, offering insight on users’ needs, expectations, problems, tendencies, mental models, and desires for future tool capabilities.

RAPID USER TESTING CYCLE

As the project neared completion, it was necessary to test users in smaller batches and in shorter intervals. This technique is referred to as rapid iterative testing and evaluation or rapid user testing.

Rapid user testing is a tool used often by UCD&E in situations where a research team wants to speed up the iterative process of “test-design-code-repeat” shown in Figure D-1.

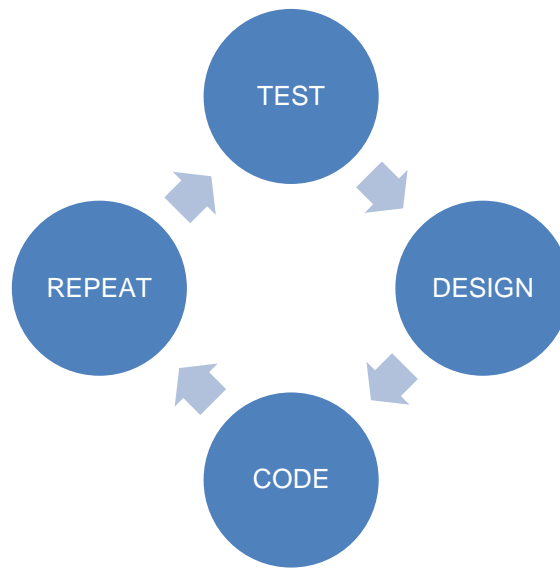


Figure D-1. Rapid user testing iterative process.

In rapid user testing, changes to the user interface are made as soon as a problem is identified and a solution is clear. These changes can usually be done in a single day with minimal investment in time, equipment, or user participation. During portal testing, the UCD&E team supported the rapid development schedule assigned by the development team by using rapid user testing. Rapid user testing enabled the UCD&E team to meet tight schedule demands.

WHY RAPID USER TESTING?

Key elements of rapid user testing include:

- Uses fewer participants than traditional user testing, generally three to six participants per test. Despite a smaller sample size, this feedback identifies most major issues in user-centered design tests.
- Can be completed in one day. With fewer participants, the time investment is minimal, and scheduling issues are minimized.
- Findings are reported quickly. Emailed summaries of reported findings are timely and more useful than formalized reports, especially near the end of the development process.
- Due to the smaller sample size and quick turnaround, costs are significantly lower than those associated with traditional user testing. When a project is on a tight deadline, with limited funds, rapid user testing is a very effective means of user testing.
- Overall interval time (from one test to another) is shorter. Work needed between tests is minimized, allowing the whole team (including development and management) to focus efforts on implementing the recommendations and improving the product.

In the UCD&E Branch, rapid user tests found particularly useful for:

- Testing ideas quickly
- Validating concepts and initial designs
- Providing new insights
- Highlighting areas that may require further testing
- Settling internal disputes quickly
- Preventing project teams from heading down the wrong path
- Informing the next steps of the design and direction of the project

To keep up with the fast pace of technological development, the design process iterations need to happen faster, while still producing high-quality user feedback, which is the role of rapid user testing. Despite a small participant sample size, rapid user testing can give project teams the direction they need to pursue or discard a design, and improve tool functionality and user experience.

METHODOLOGY

OVERVIEW

This section contains methods used for the portal study rapid user testing. Over three rounds of rapid user testing participants were asked to perform a series of tasks within a limited project portal website with partial functionality.

The tasks chosen for each round were based on several factors:

- Desire to test recently enabled functions
- Need for exploring and/or isolating issues found during previous experiments
- Help to make design decisions between unsettled options

As such, at various points, users were asked to perform a series of tasks given on a series of the Rapid User Testing Scenario task cards found in Figures D-2 through D-8, including:

- Logging in with CAC
- Creating a project
- Changing a project logo
- Searching for personnel
- Adding project team members
- Assigning roles
- Editing roles
- Downloading project rosters
- Opening csv roster in Excel®
- Marking completion of tasks in project dashboard
- Navigating within site
- Navigating to Project Information Tracking tool (PITT)

Figure D-2 shows the Scenario task cards used during rapid user testing scenario testing conducted October 1, 2015.

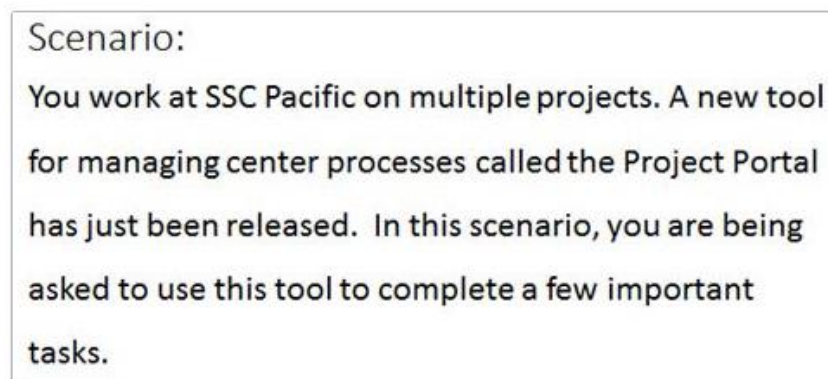


Figure D-2. Scenario task cards.

Figure D-3 shows New Project cards used during rapid user testing scenario testing conducted October 1, 2015.

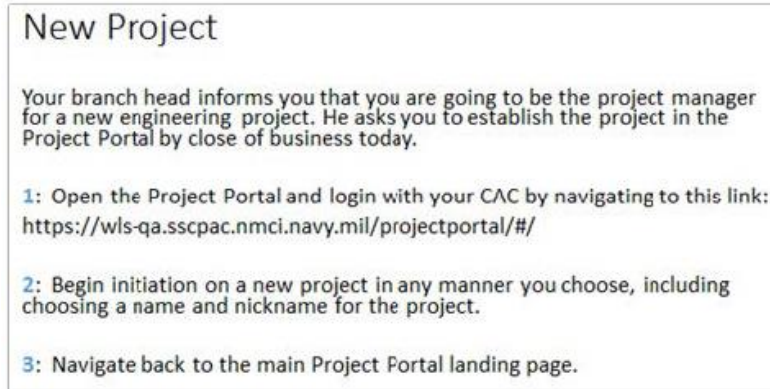


Figure D-3. New Project cards.

Figure D-4 shows update Project Roster cards used during rapid user testing scenario testing conducted October 1, 2015.

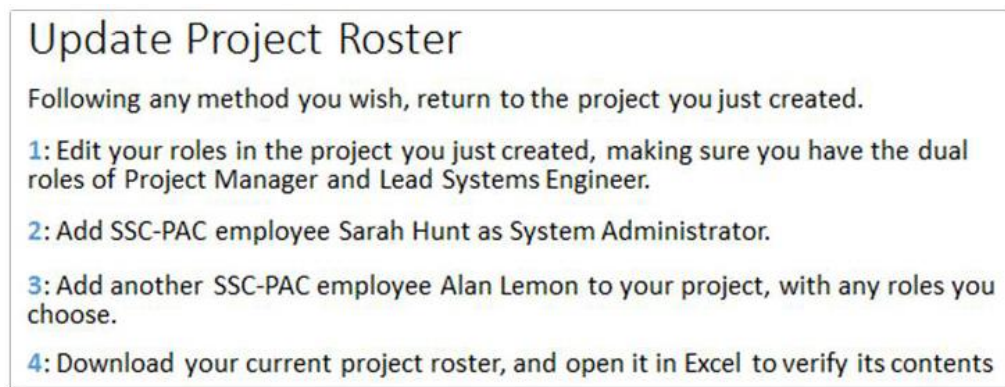


Figure D-4. Update Project Roster cards.

Figure D-5 shows Complete Project Initiation cards used during rapid user testing scenario testing conducted October 1, 2015.

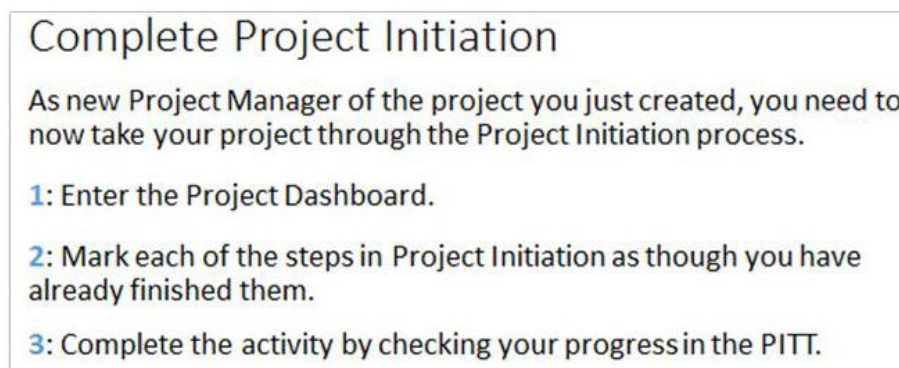


Figure D-5. Complete Project Initiation cards.

Figure D-6 shows the Stormcloud card used during rapid user testing scenario testing conducted October 1, 2015.

Stormcloud

Your branch head informs you that you are going to be the project manager for a new project called “**Stormcloud**”. He asks you to establish Stormcloud in the Project Portal by close of business today.

Activity 1: Use the Project Process Portal to start a new project called “Stormcloud.”

Activity 2: Go into the Stormcloud project, and update the project logo to the Stormcloud icon in the Project Icons folder on your desktop.

Figure D-6. Stormcloud cards.

Figure D-7 shows Viceroy cards used during rapid user testing scenario testing conducted October 1, 2015.

Viceroy

Following any method you wish, establish another project in the Project Portal

Step 1: Name this project Viceroy.

Step 2: Return to the Project Portal landing page.

Step 3: Change the project icon to the Viceroy icon, as before.

Figure D-7. Viceroy cards.

Figure D-8 shows Project 3 cards used during rapid user testing scenario testing conducted October 1, 2015.

Project 3

Following the instructions given orally, establish another project in the Project Portal.

Step 1: Name this project.

Step 2: Return to the Project Portal landing page.

Step 3: Change the project icon to one of your choice.

Figure D-8. Project 3 cards.

As users stepped through the cards, the UCD&E team recorded the sessions for easier data collection in post-session analysis. All issues found were immediately analyzed, documented, and sent out through email to the development team with recommended changes to implement. Two informal wrap-up test result reports were provided through email to the development team and Process Architecture Improvement Project (PAIP) team in August.

TEST ENVIRONMENT

The test configuration used for the three rounds of rapid user testing consisted of:

- A laptop and mouse
- Internet Explorer 10 and Camtasia Video Capture[®] Software for post-test analysis.
- An additional monitor to mirror (clone) the screen used by the participant, which allowed researchers to view tasks as they were performed.

All testing took place in the UCD&E facilities at SSC Pacific. The protocol for all rounds of rapid user testing is included in Appendix B.

USERS

OVERVIEW

This section contains an overview of the background of the participants for the portal study.

Participants were chosen for the three rounds of rapid user testing through three methods:

1. An open call to personnel who wanted to participate
2. Users who had previously wanted to participate but had been unable to fit into our testing schedule
3. A convenience sample of nearby interested SSC Pacific employees.

DEMOGRAPHICS

The chart in Figure D-9 shows the percentage of employee's participations in the rapid user tests by code. The distribution is based on three rounds of rapid user testing.

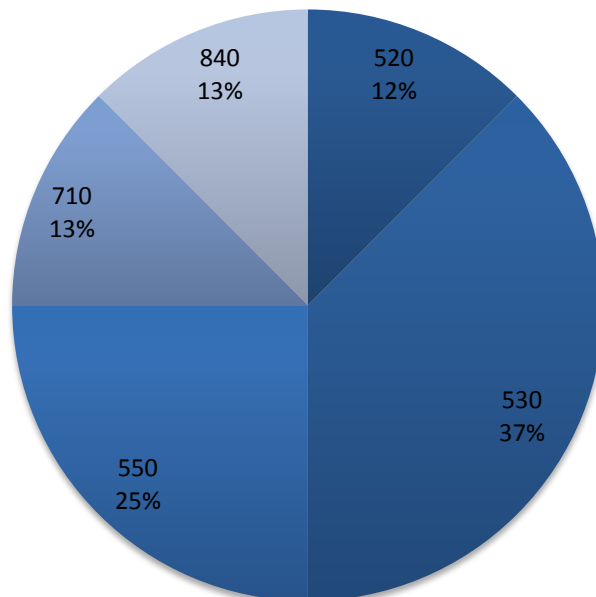


Figure D-9. Participants of rapid user tests by code.

FINDINGS

OVERVIEW

This section contains findings from the rapid user testing conducted October 1, 2015.

RAPID USER TESTING FINDINGS

Create a Project Functionality

Users who attempted to create a project using methods provided in the project portal interface were successful. Every user completed the task, with minimal delays or confusion, and expressed confidence in repeating the task in the future. There were no user-experience-related mistakes. Clear portal definitions and instructions led to successful user performance. The Input/Output screen transitions and graphic user interface wizards performed according to users' expectations. Users could navigate successfully through portal software solution paths and could complete tasks in every instance. Users appreciated the ease and forethought designed into the portal as a whole, and the straightforward nature of the graphic user interfaces.

Uploading and Downloading

Tasks such as uploading an image (for use as the project logo) and downloading data to Excel[®] (for example, a project roster) were successful. Because the portal follows basic conventions, the resulting interactions met users' expectations and were completed without errors. The only difficulties that occurred were related to minor interface issues related to screen refresh rates in the portal. In each instance, a project logo didn't appear in the project dashboard after upload; the user had to refresh the page to see the change. We suggested to the development team that that refresh is done automatically to allow the user to see the result of their actions instantaneously.

Intermittently Long Lag Times

Most of the user tests had few technical issues, but one in particular, took much longer than the others. One test participant experienced an extraordinarily long lag in updating the project roster that resulted in the user downloading an incomplete roster (the roster was missing one name).

The interactions and loading times of that one test are listed as follows:

- Logging in with CAC, (from browser entry to portal appearing): 60 seconds
- Clicking on "My Teams" until roster appeared on page: 34 seconds
- Searching for a name in the personnel search (from click to result appearing): 13 seconds
- Clicking "Assign" for roles until the name appeared in the roster list: 22 seconds
- Searching for another name: 10 seconds
- Assigning roles, and appearing in roster: 22 seconds
- Clicking on "My Teams" again: 37 seconds
- Searching for another person: 10 seconds
- Searching for another person: 10 seconds

One of these lags caused the incorrect download shown in the interactions and loading times list above. For unknown reasons, this particular user had longer lag times than any of the other users tests conducted during these sessions. Some of the other tests had varying lag times, though they were shorter than those times documented above. The lag times were not always present. One participant experienced the opposite, nearly every interaction with the portal was instantaneous. The UCD&E team recommended to the development team that it look into this issue and take actions to keep wait times as short as possible.

Personnel Search issues

When searching for a name in personnel search, the field called out to do this is “Last Name” then “First Name”. The labeling of these boxes lies within the boxes themselves and appears before any text is entered in the field. It also disappears after the user clicks on them. One user had difficulty noticing these labels, and kept entering the desired first name in the “Last Name” field, and the desired last name in the “First Name” field. When the search returned no results, the user was frustrated. Additional user testing is recommended to determine if this issue is widespread among the user population, or an isolated occurrence.

The search directory results appearing in the portal currently have no order associated with them. Users expect a clear order in their search results, generally alphabetical. The UCD&E team recommended to the development team to adopt a default configuration of “alphabetical order by last name” to display found names.

The personnel database used to look up people by name is incomplete. It contains many names without emails or phone numbers. Whenever one of those people creates a project, the project encounters numerous errors. Users with incomplete records are prevented from being added to a project within the portal. The reasons for this are unclear at this point.

The UCD&E team suggested that the development team ensure that data sources are complete and contain all information required by the product. Also, user assistance messages should be developed to address cases in which the data source is incomplete to permit the users to proceed with their tasks. Future tests need to be conducted on systems that have a configuration typical of those used by the expected “normal” end-user to ensure that everything works as intended.

INTERFACE BUGS

OVERVIEW

This section contains interface bugs found during study for this report. During the rapid user testing sessions conducted August 11, 2015, users saw an extra line in the “project team members” table, in which no information was populated. Instead, there was a hyperlink labeled “Click to add role(s)” highlighted in yellow, as shown in Figure D-10 and Figure D-11.

Project Team Members

Select a Project:

[Add New Team Member](#) [Remove Selected](#) [Export List](#)

Project	Last Name	First Name	Code	Email	Phone	Roles	Remove
						Click to add role(s)	<input type="checkbox"/>
			55	USERNAME@NAVY.MIL			<input type="checkbox"/>

Figure D-10. Interface bug example one.

Project Team Members

Select a Project:

[Add New Team Member](#) [Remove Selected](#) [Export List](#)

Project	Last Name	First Name	Code	Email	Phone	Roles	Remove
GUI				USERNAME@NAVY.MIL		Project Manager	<input type="checkbox"/>
						Click to add role(s)	<input type="checkbox"/>
						Click to modify roles	

Figure D-11. Interface bug example two.

In this line is a link that opens an interactive window for assigning roles. Activating the link leads to an error message. This link is unexpected and confusing for users because it causes an interaction without any possible positive resolution. One user believed the bug shown in Figure D-10 and Figure D-11 was an additional method of adding a team member. The UCD&E team concurs this method of adding a team member would be a beneficial feature if it worked. However, in the existing portal software it does not work and leads to a dead end in the portal software. Notice the placement of the extra line was different in each case, as well. UCD&E recommended that this line be fixed or removed before further testing.

Additionally, in Figure D-10 and D-11, the icons above the “Add”, “Remove”, and “Export” links are missing. This bug only manifests in certain configurations of hardware and software. Key icons and specific navigation and environmental cues appear to be missing, depending on which computer and which browser is used. All tests were performed using Internet Explorer® (IE) 10, and although the UCD&E team tried to control for as many platform environments as possible (make and model, version of IE, laptop vs. desktop), various key visuals were not visible throughout the tests. The

UCD&E team suggested that the development team conduct tests on typical user systems configuration using multiple browsers to ensure that all visual and interaction elements work the same across browsers, regardless of system, browser, or other variable (like network). As of this writing, the UCD&E team has not discovered the reasons for the missing icons, but recommended that the development team follow up on the issue. This solution should be a high priority as additional users may have the same problems.

Figure D-12 shows the protocol script used during rapid user testing scenario testing conducted October 1, 2015.

Thank you for making time in your schedule for us!

My name is _____. I'm a Human Factors Engineer in the UCD&E group and we're helping design a suite of tools to help support our project managers.

This is _____ s/he'll be taking notes throughout our session.

Today we'd like to show you an incomplete version of a website that is one vision of what a new Center process tool might look like. These are early designs so some of it will be incomplete. There will be elements that have fairly good detail, and there will also be elements that will be completely missing.

During this session, we will be taking notes (and recording) in order to make a record of our session. These notes and recordings are only for our reference. They are simply materials we will use as we revise our design and update User Requirements. None of the information you share with us will be attributed to you and will be anonymized in any supporting documentation or presentations we develop as a result of this session.

While we look at these pages together, I want to remind you that you're helping us test the site design – we're not testing you. You are giving us valuable insights that will allow us to help users like you. So be as detailed and honest as you can, and try not to be nervous. This is not a test of your abilities, but a test of the page design. If something's not clear to you, that's OUR fault.

What we are going to do today is called a "task-based analysis". What we will do is give you a scenario similar to something that might actually happen in real life, with a couple extremely simple tasks to perform. We would like you to complete these tasks as best as you can with the interface we are looking at. During this time, we will be observing simply as a means of gaining insight into the usability of the tool as currently designed.

The most important part about your participation in this session is that you consider each task carefully and complete it as best you can.

Finally, it's important for you to know that you may stop this session at any point. Similarly, if I ask you to do something you cannot do, for any reason, simply tell me and I'll move on. It's important that you feel comfortable throughout this process. If you want to stop at any time, just let me know.

Before we begin, do you have any questions or concerns about this process?

Are you ready to begin?

Figure D-12. Protocol script.

Figure D-13 shows the rapid user testing survey used during rapid user testing scenario testing conducted October 1, 2015.

Participant Code	SSC-Pacific Code
Please select your highest degree earned	
<input type="checkbox"/> High School	
<input type="checkbox"/> Bachelors	
<input type="checkbox"/> Post Graduate	
<input type="checkbox"/> Masters	
<input type="checkbox"/> Doctorate	
<input type="checkbox"/> Post Doctorate	
Area of study: _____	
How many years have you spent in government service?	
_____ years	
How long have you been a project manager?	
<input type="checkbox"/> Less than 1 year	
<input type="checkbox"/> 1-5 years	
<input type="checkbox"/> 6-10 years	
<input type="checkbox"/> 11-15 years	
<input type="checkbox"/> 16+	
On average, how many projects do you typically manage at the same time? Please include any projects where you are listed as the project manager or integrated product team lead	
<input type="checkbox"/> 1	
<input type="checkbox"/> 2-3	
<input type="checkbox"/> 4-5	
<input type="checkbox"/> 6-10	
<input type="checkbox"/> 11+	
How often do you delegate project management tasks like filling out the WAT or PIT to another person?	
<input type="checkbox"/> Always	
<input type="checkbox"/> ¾ of the Time	
<input type="checkbox"/> Half of the Time	
<input type="checkbox"/> ¼ of the Time	
<input type="checkbox"/> Never	

Figure D-13. Rapid user testing survey.

CONCLUSION

Virtually everything the UCD&E team tested, beyond what was documented above, tested extremely well. Users successfully completed all tasks given them, apart from those exceptions. Overall, the three rounds of user testing was sufficient to capture the large majority of user experience issues in what the UCD&E team was able to test. The pace was fast enough to prevent the development team from doing unnecessary rework in many cases, but moderate enough for success with a smaller team. The UCD&E team would have liked to do more testing on other areas of the design, but due to schedule and personnel constraints in the development team, this was unrealistic.

The development team did a “wonderful” job coding the permissions and certificates for logging into the project portal. Both types of CAC certifications (regular and email) work for users logging into the portal. This feature gives users easy access into to the portal and less frustration, delay, and annoyance due to failed logins.

The “skipped”, “complete”, and “in progress” labels to be adopted within the project dashboard need to float and/or stick as users scroll down through the rest of the page. This recommendation was explicitly described as part of the original design, and remains an integral part of efforts to improve user experience before final release to the general SSC Pacific user population.

Finally, there is a great degree of learning present in our rapid user testing. As each participant repeated tasks, the time and effort required to complete the task was reduced with each repetition. Repeated performances resulted in easier and quicker task completion. This approach is a key finding of rapid user testing, and a major success as well users can quickly become “experts” in performing basic tasks after two or three instances of doing the same thing in the software. This result suggests that the site, as designed, will lead to improved experience and greater performance capabilities among most of our user population.

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APPENDIX E

SCREEN MAP OF PORTAL ELEMENTS AUGUST 25, 2015 STUDY AT SSC PACIFIC

Jack Viraldo and Ron Higgins

User Center Design & Engineering Branch Project Management Team

APPENDIX E

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SCREEN MAP OF PORTAL ELEMENTS

OVERVIEW

The User-Centered Design and Engineering (UCD&E) team worked with developers to improve the portal software. This appendix contains reference material distributed electronically to developers that was used as a guide in developing the portal software. Figure numbers were used to provide targeted feedback for specific portal software regions, icons, screen graphics and menus. Numbers were also used to track details of feature implementation. Number tracking details are in Appendix F.

Portal Software Areas Evaluated

Following is a breakdown of figures in this section.

Landing Page

The Landing Page is shown in Figures E-1 and E-2.

Projects

My Projects Grid View is shown in Figure E-6. Project Cards layout specification is shown in Figure E-7. Examples of two Project Cards are shown in Figures E-10 and E-11. My Project (List View) is shown in Figure E-8. Figure E-9 shows the Project Status Filter.

Project Dashboard

The Project Dashboard is shown in Figure E-19. An example of using the Project Dashboard to delegate a function is shown in Figure E-20. An example using the Project Dashboard to join or leave a project is shown in Figure E-17.

Project Teams

All My Project Teams is shown in Figure E-12. Filters for Team Tables is shown in Figure E-13.

Roles Wizard

The roles wizard is shown in Figures E-14 to E-15.

Navigation

Global Navigation is shown in Figure E-4. Manage Persistent Navigation is shown on Figure E-5.

Portal Flow Diagrams

Flow diagrams are shown on Figures E-11, E-20 and E-29.

Other Portal Figures

The Project Dashboard is shown in Figures E-19 to E-21. The Workspace Display is shown in Figures E-22 and E-23. Explore Learn, Practice and Browse are shown in Figures E-27, E-28 and E-30. An example of the Help screen is shown in Figure E-16. The Footer is shown in Figure E-3.

The Landing Page is shown in Figures E-1 and E-2.

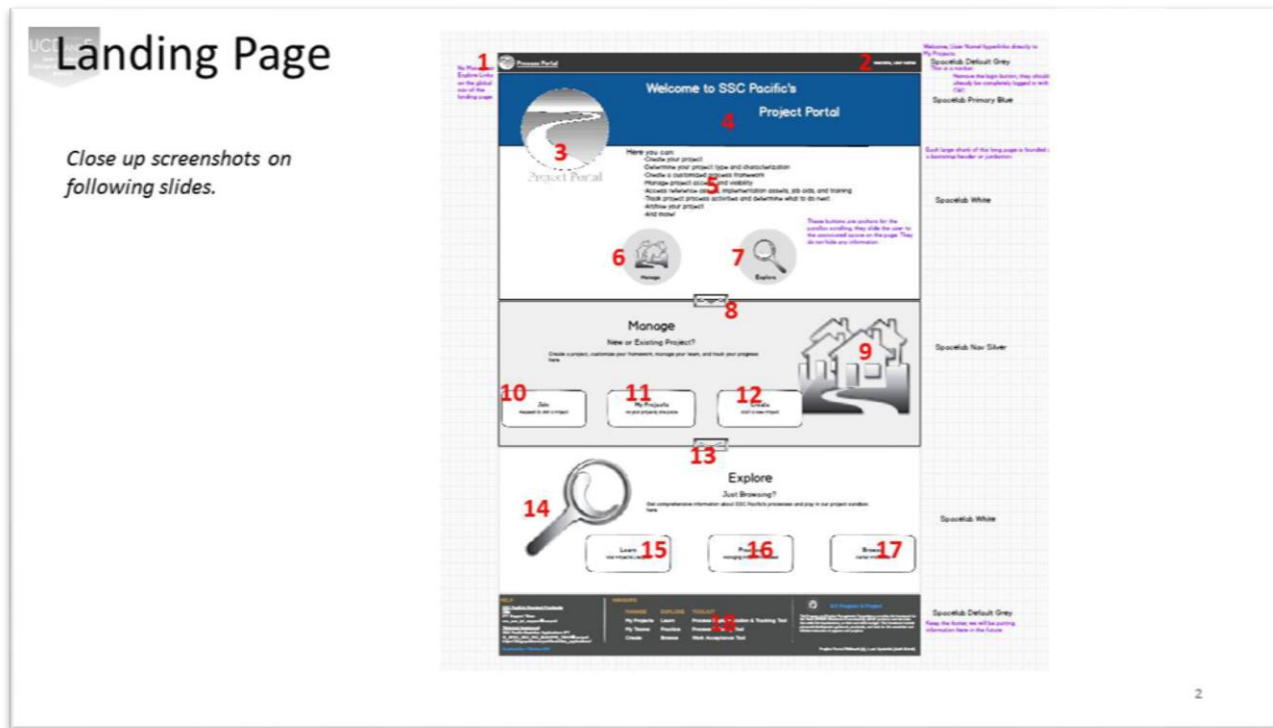


Figure E-1. Landing Page (part one).

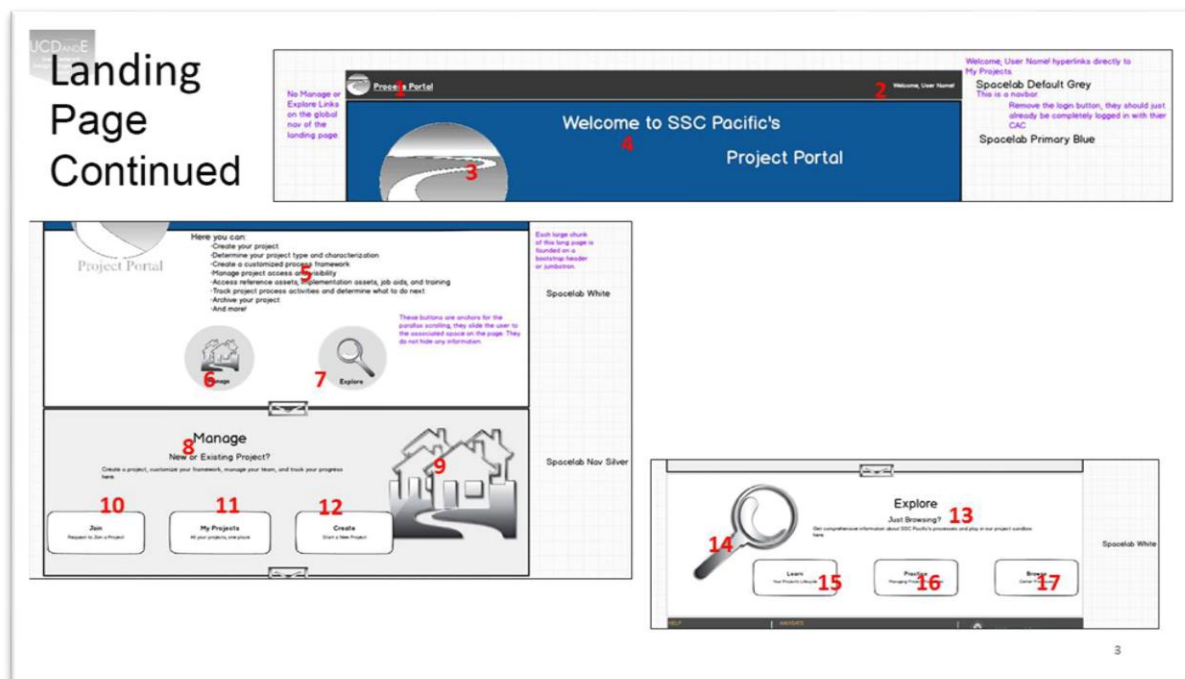


Figure E-2. Landing Page Continued (part two).

One of four footers is shown in Figure E-3.

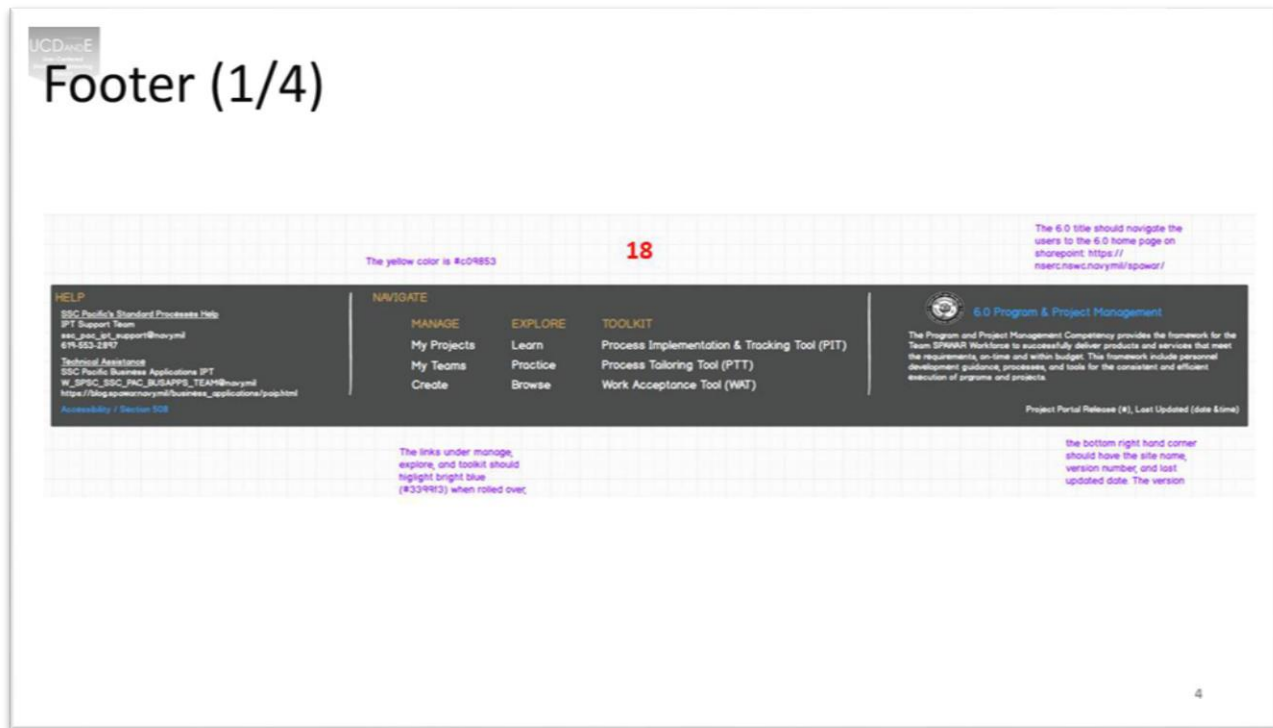


Figure E-3. Footer (one of four).

An example of Global Navigation is shown in Figure E-4.

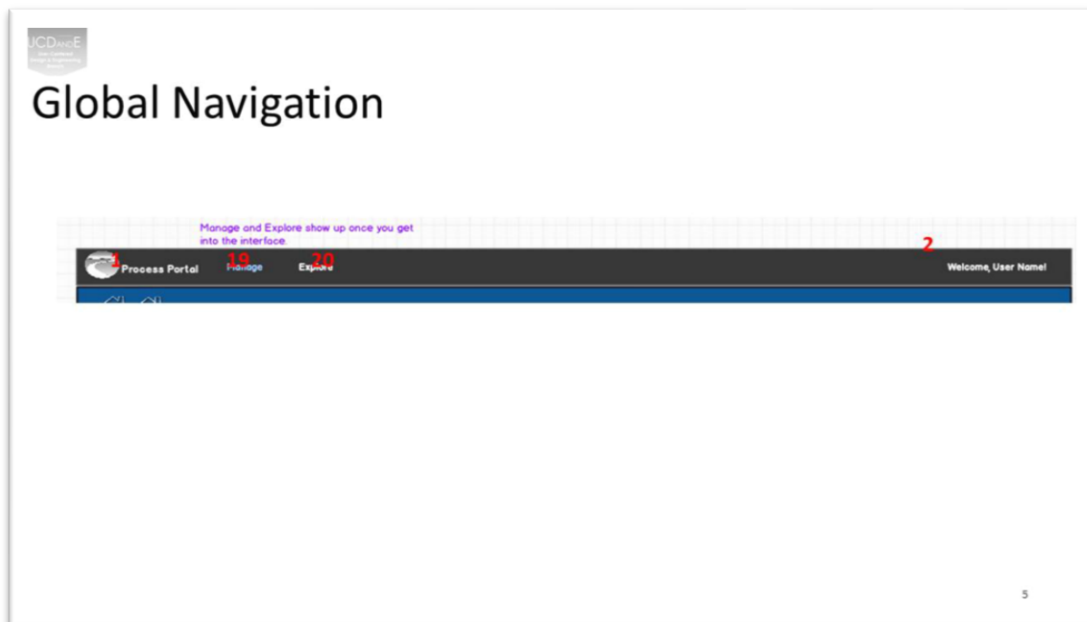


Figure E-4. Global Navigation.

An example Manage Persistent Navigation is shown on Figure E-5.

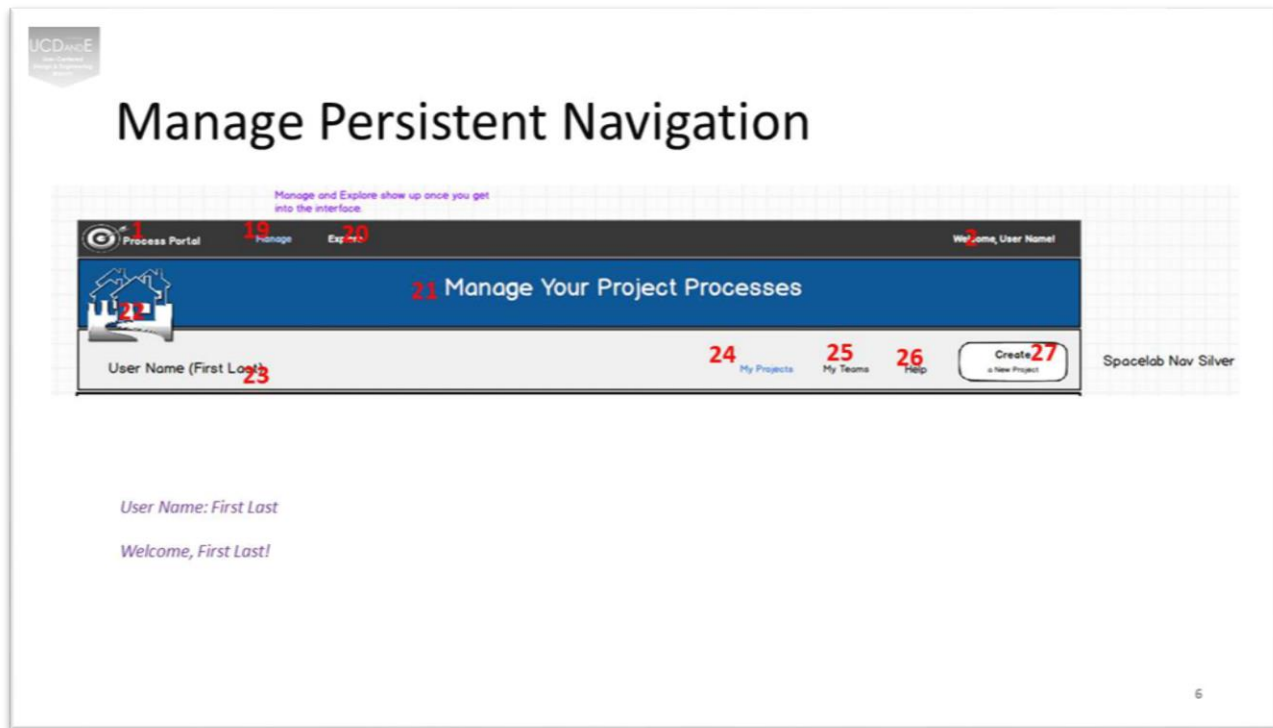


Figure E-5. Manage Persistent Navigation.

An example of My Projects Grid View is shown in Figure E-6.

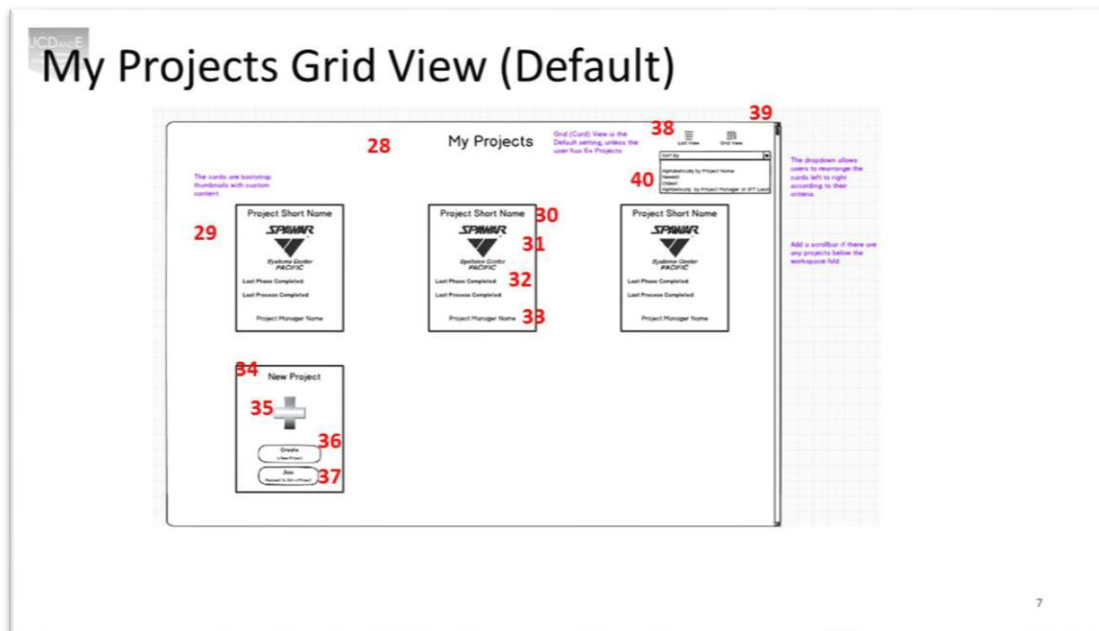
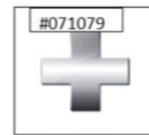


Figure E-6. My Projects Grid View (Default).

JCD_{ANCE}

ICU11



Project Short Name



Last Process Completed:

Everything should be centered.

Clicking anywhere on the card should take you to the project dashboard.

Project Short Name



Last Process Completed:

The default project logo is simply SPAWAR. The user can change this image at any point from inside the project card, at the logo in the upper left corner.

34 New Project



quest to Join a P

This is always the last card, and they can make or join a new project from here (access those dialogs).

8

UCDANCE

UCDANCE

If you click on a project it takes you to the project dashboard.

My Projects

1

40

36

Create

37

Excel Style filters just like in Team.

[illegible]

When in list view the drop down is disabled.

E-8

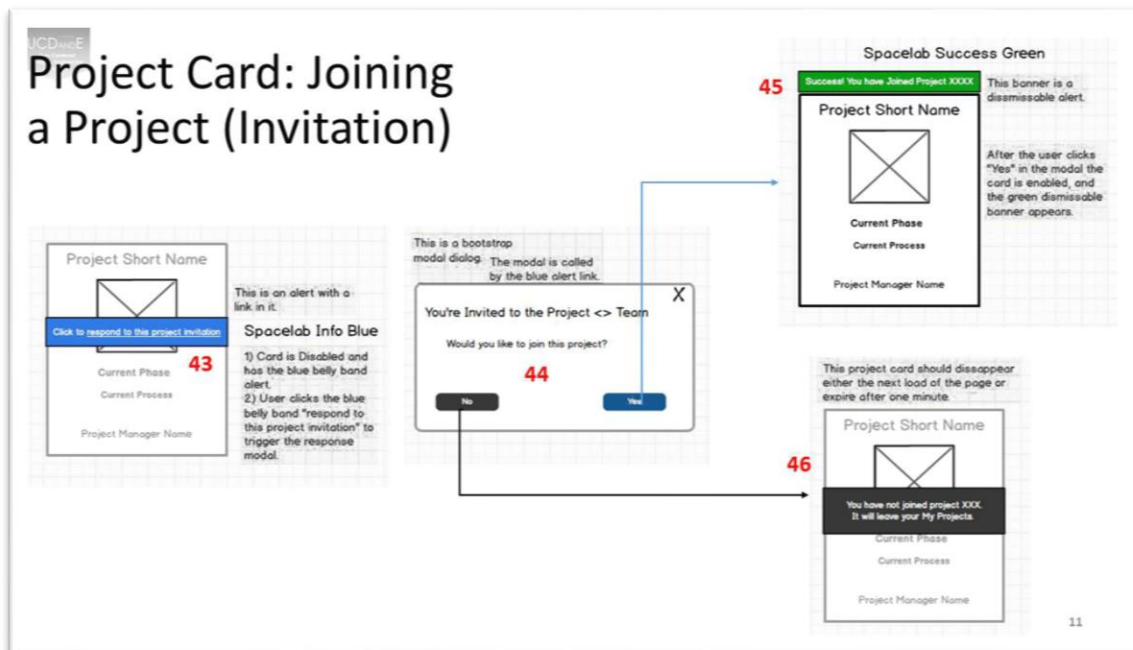
Project Status Filter



10

Figure E-9. Project Status Filter.

An example of the Project Card: Joining a Project (through invitation or request) is shown in Figures E-10 and E-11.



11

Figure E-10. Project Card: Joining a Project (Invitation).

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UCD AN **OE**
User-Centred
Design & Engineering

13

Filters for Team Tables is shown in Figure 13.

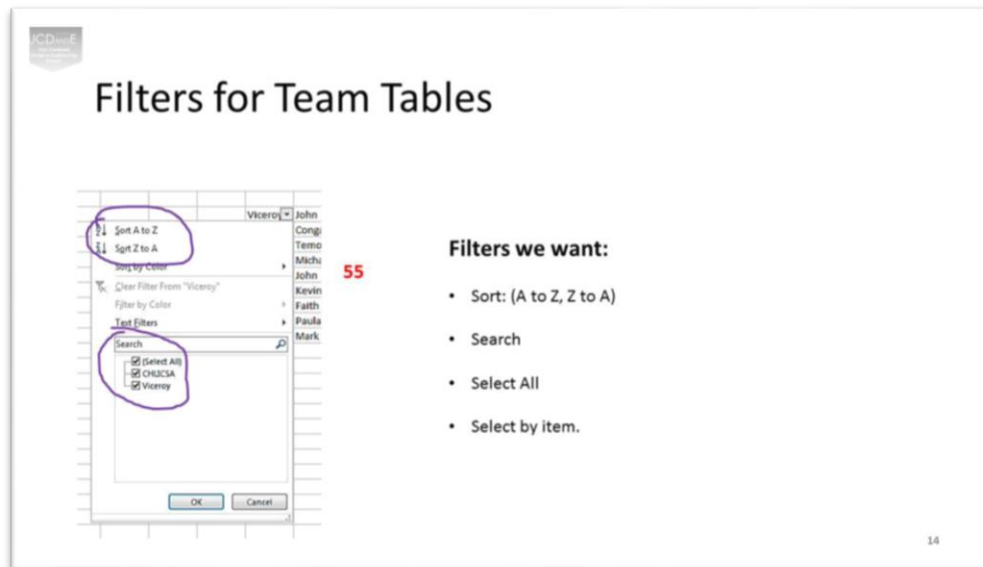


Figure E-13.Filters for Team Tables.

The Roles Wizard is shown in Figure E-14, three different design options are shown in 1a, 1b, and 1c.

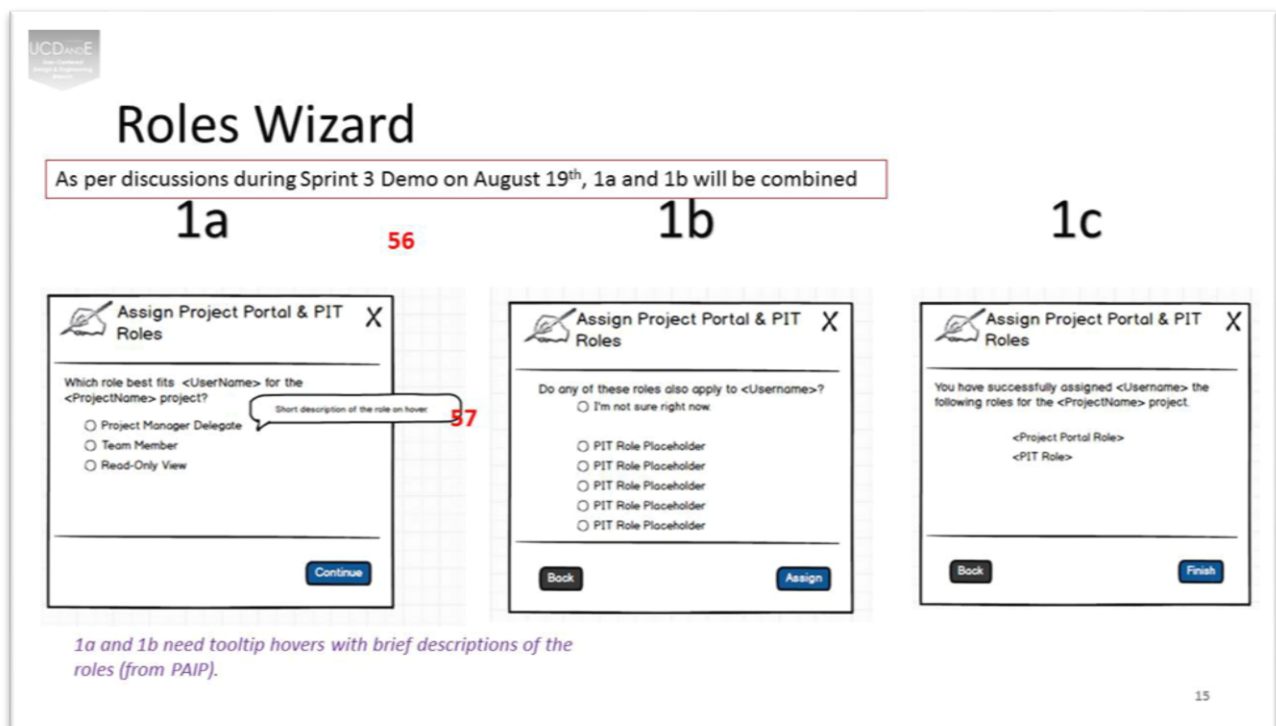


Figure E-14. Roles Wizard.

The Roles Wizard Tooltip Hovers is shown in Figure E-15.

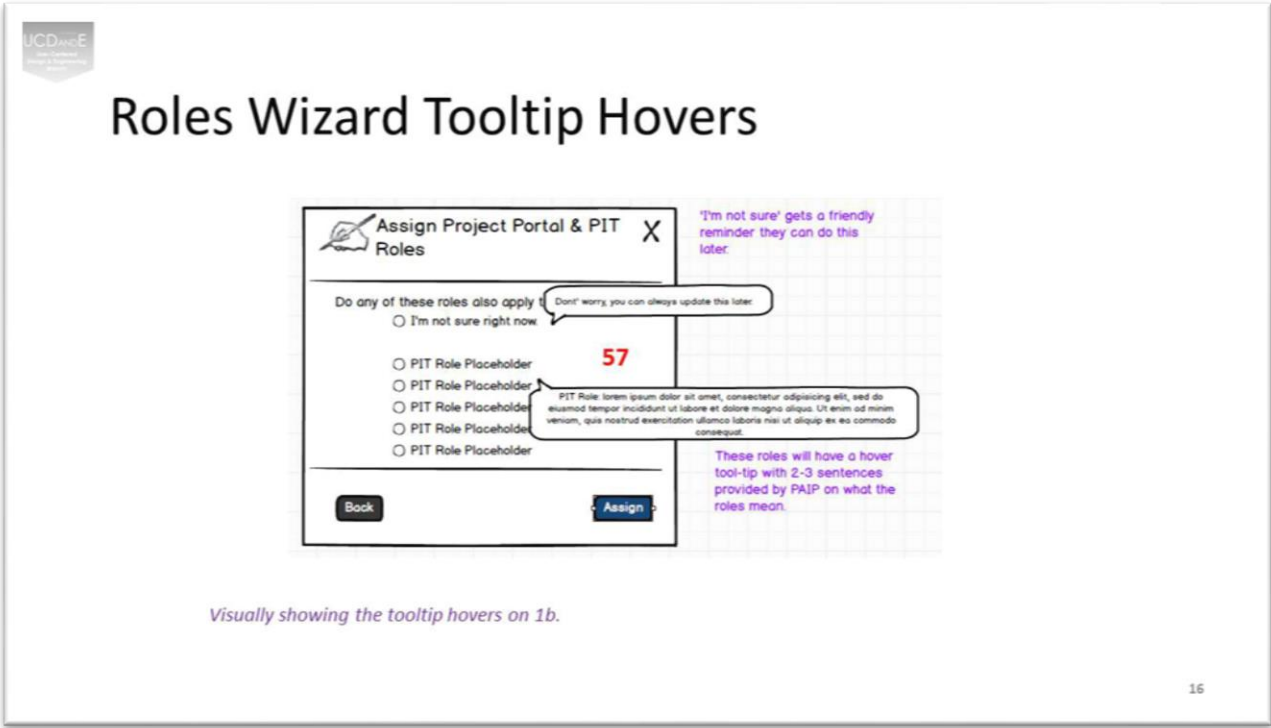


Figure E-15. Roles Wizard Tooltip Hovers.

An example of a Help screen is shown in Figure E-16.

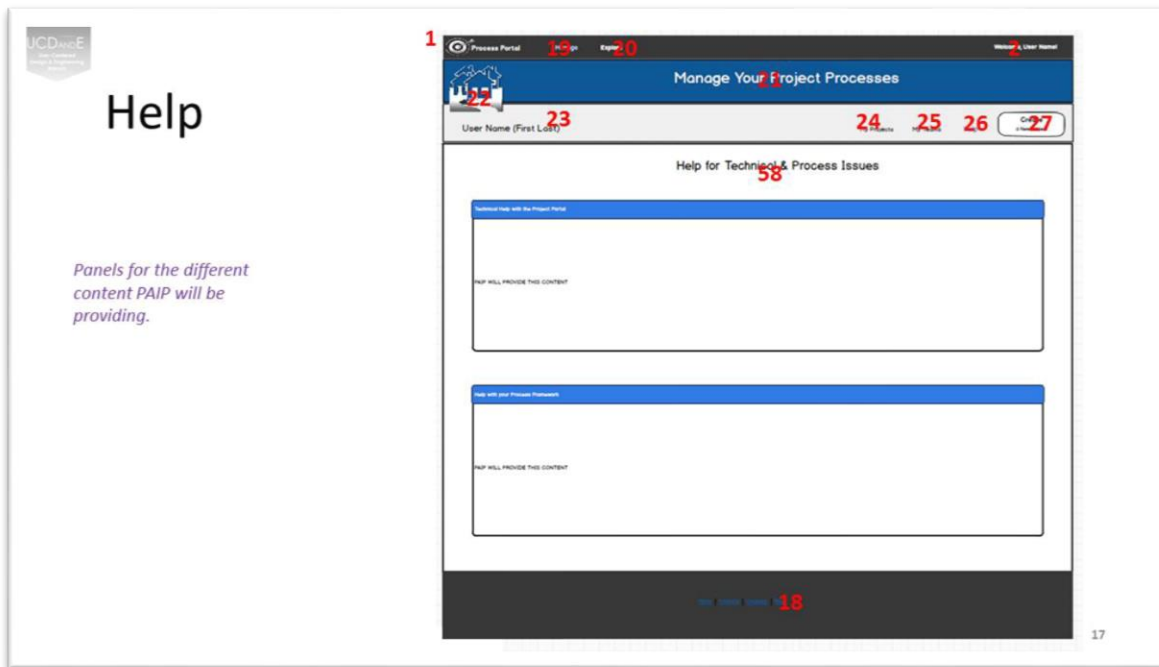


Figure E-16. Help.

Two navigation examples are shown in Figures E-17 and E-18.

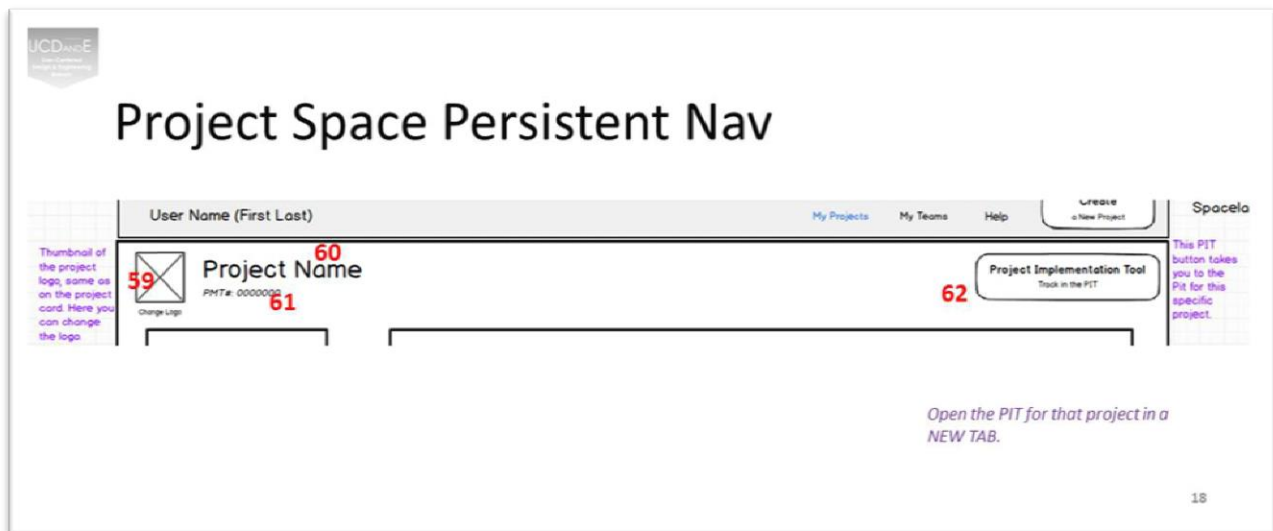


Figure E-17. Project Space Persistent Nav.

Left-Hand Nav Elements

Top-Half

The user needs to be able to open and close all the elements on the left hand nav without navigating off their current page.

Vertially Stacked Pills 63

Project Dashboard

Project Initiation ▾

Process ▾

Activity

Process >

Process >

Planning & Customer Requirements >

System Requirements & Design >

Develop / Integrate / Test >

Production & Deployment >

Operations & Sustainment >

Project Closeout >

Separate the Dashboard pill from the phases to eliminate the gestalt association.

Only go down to the activity level.

64

Bottom-Half

Project Team 65

No dropdown so no arrow

Toolkit 66 ▾

Operations Measurement Repository (OMR)

Project Implementation Tacking (PIT) Tool

Project Tailoring Tool (PTT)

Work Acceptance Tool (WAT)

Alphabetical : Interactive web applications only E.G not the PAL

References 67 ▾

End-to-End Workflow

Implementation Assets

Process Asset Library (PAL)

Operations Measurement Repository (OMR)

Training

Alphabetical : additional reference material - DO NOT TITLE RESOURCES

Full View

The user needs to be able to open and close all the elements on the left hand nav without navigating off their current page.

Vertially Stacked Pills 63

Project Dashboard

Project Initiation ▾

Process ▾

Activity

Process >

Process >

Planning & Customer Requirements >

System Requirements & Design >

Develop / Integrate / Test >

Production & Deployment >

Operations & Sustainment >

Project Closeout >

Separate the Dashboard pill from the phases to eliminate the gestalt association.

Only go down to the activity level.

64

Project Team 65

No dropdown so no arrow

Toolkit 66 ▾

Operations Measurement Repository (OMR)

Project Implementation Tacking (PIT) Tool

Project Tailoring Tool (PTT)

Work Acceptance Tool (WAT)

Alphabetical : Interactive web applications only E.G not the PAL

66

References 67 ▾

End-to-End Workflow

Implementation Assets

Process Asset Library (PAL)

Operations Measurement Repository (OMR)

Training

Alphabetical : additional reference material - DO NOT TITLE RESOURCES

67

Figure E-18. Left-Hand Nav Elements.

The Project Dashboard is shown in Figures E-19 to E-21.

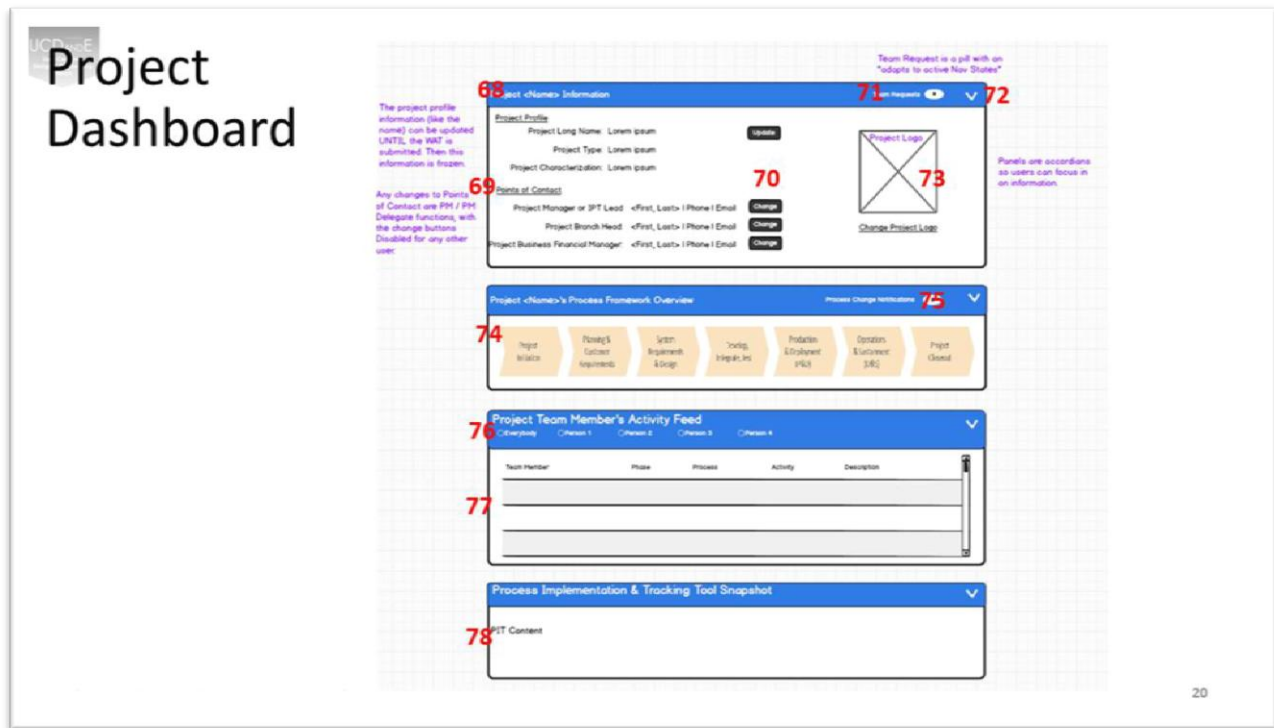


Figure E-19. Project Dashboard.

Project Dashboard: Team Member Requests is shown in Figure E-20.

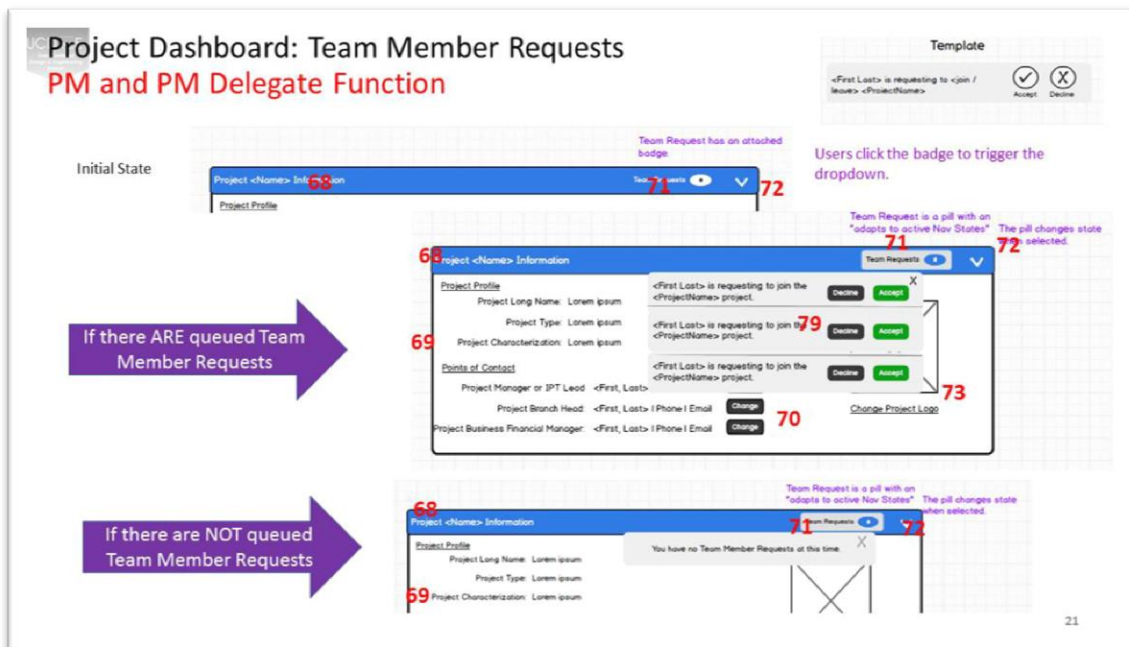


Figure E-20. Project Dashboard: Team Member Requests PM and PM Delegate Function.

The PM Dashboard Notification Join/Leave Project is shown in Figures E-21.

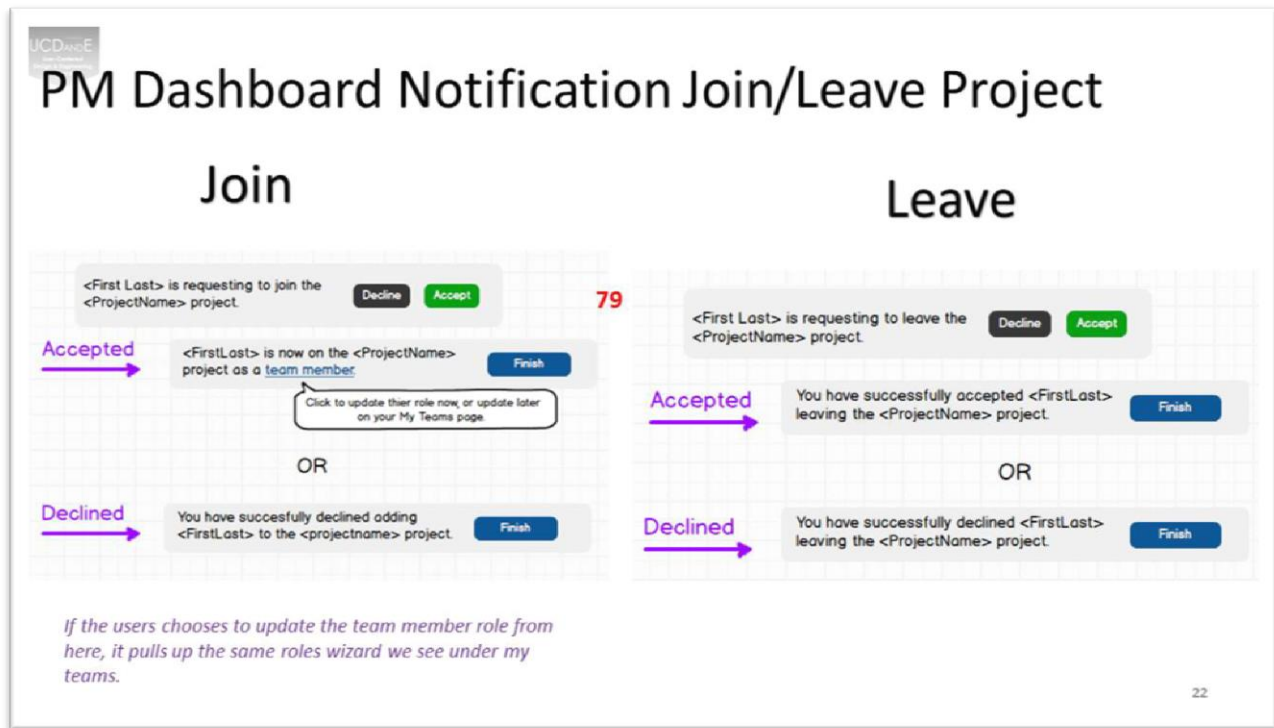


Figure E-21. PM Dashboard Notification Join/Leave Project.

Workspace @ Phase Level is shown in Figure E-22 and Workspace Display and Activity Level is shown in Figure E23.

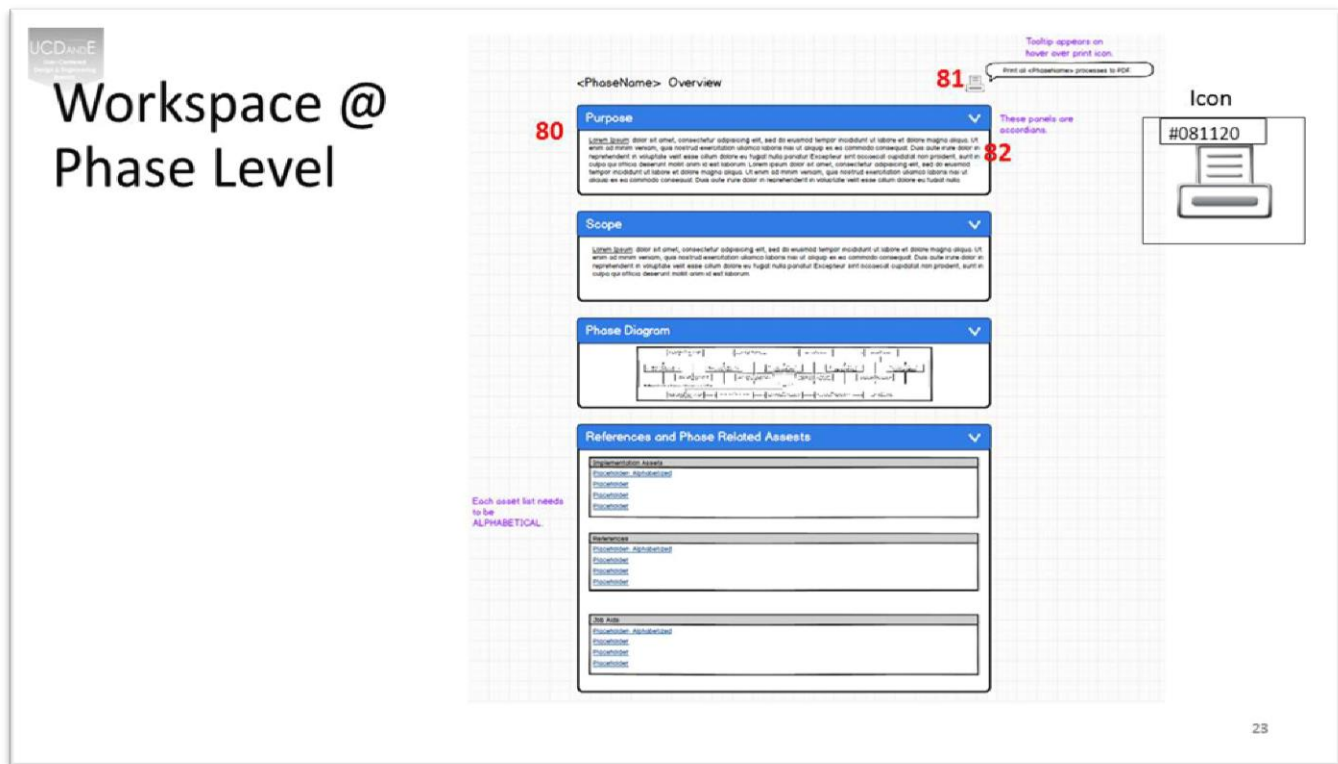


Figure E-22. Workspace @ Phase Level.

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Workspace Display @ Activity Level

The activity bar is sticky, even if the user scrolls through the tasks.

Please take note:

Activity Name 83 ○ Skipped ○ Completed ○ In Progress

Activity **83**

Activity Tasks (#)

Task 1

Task 1

Task 1

Process Related Assets

Implementation Assets

Top Assets

References

Icon

#081120

Tasks should be in Bootstrap Wells

Figure E-23. Workspace Display @ Activity Level.

E-18

The Project Team (within a Project Card), is shown in Figure E-24.

Project Team (within Project Card)

Project Name
PRJ# 000000

Project Implementation Tool
Tool in the PCT

Project XXXXX's Team

Excel Style Filters
(see example in slides)

Add New

Export Team Information

Project Name	First Name	Last Name	Email	Phone	Partial Role	PJT Role	Remove
Viceroy	John	Quintana	John.Quintana@navymil	6115321532	PJT		<input type="checkbox"/>
					+ change role		<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>
							<input type="checkbox"/>

Figure E-24. Project Team (within Project Card).

E-19

The Join a Project – Searching by Project Name is shown in (Figure E-25) email invitation is shown in (Figure E-26).

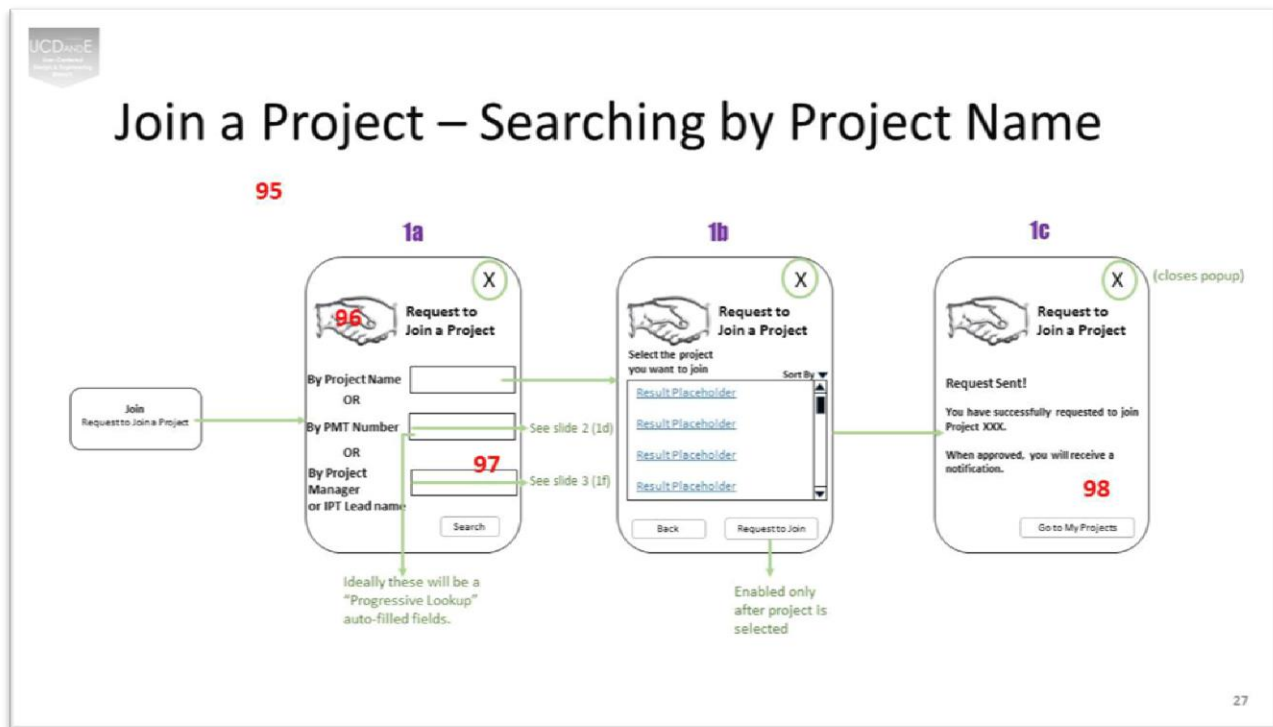


Figure E-25. Join a Project – Searching by Project Name.

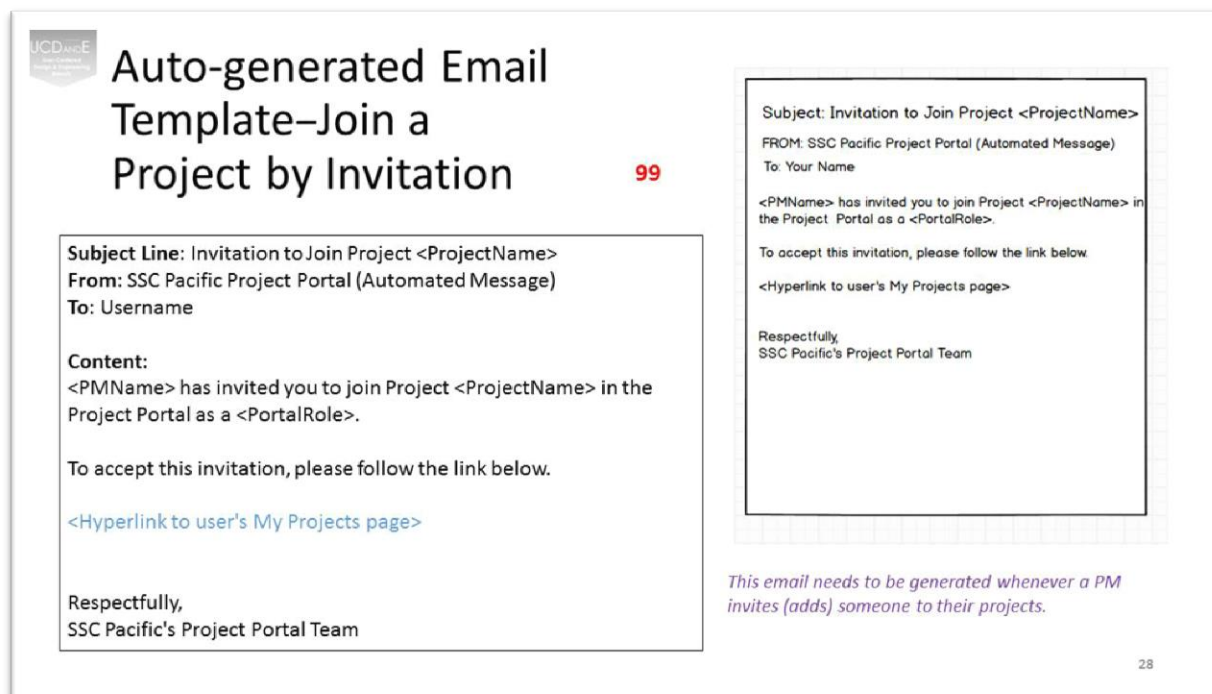


Figure E-26. Auto-generated Email Template–Join a Project by Invitation.

Explore functions are shown in Figures E-27, E-28 and E-30.

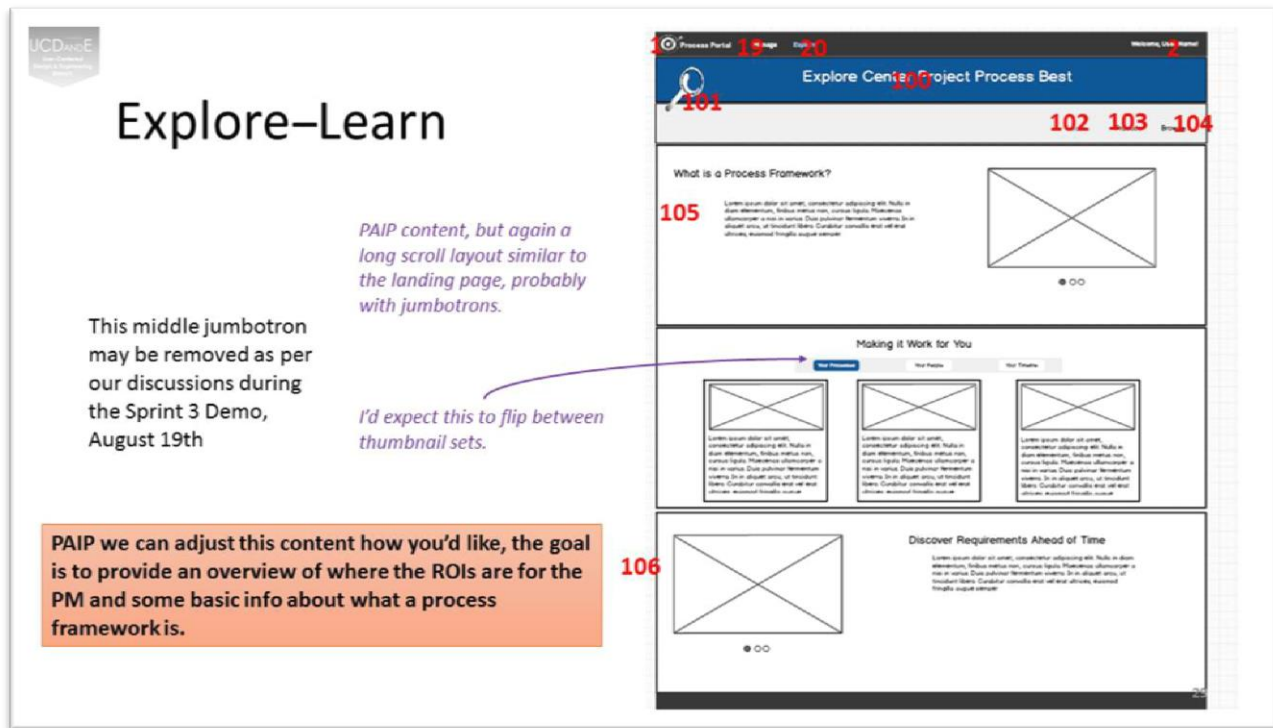


Figure E-27. Explore-Learn.

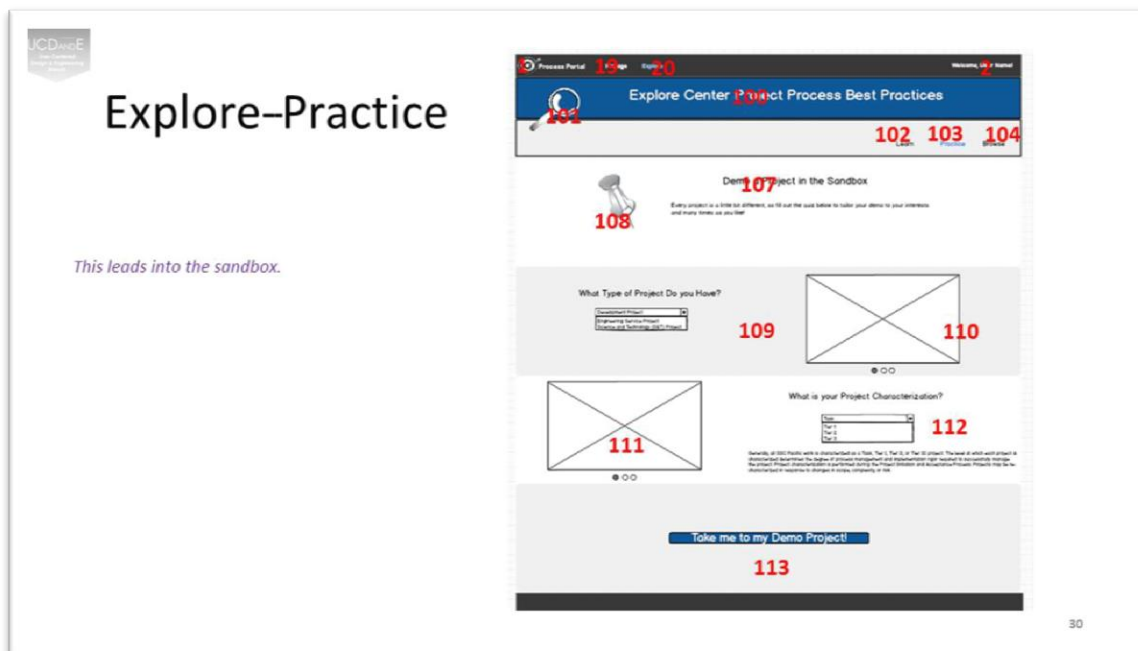


Figure E-28. Explore-Practice.

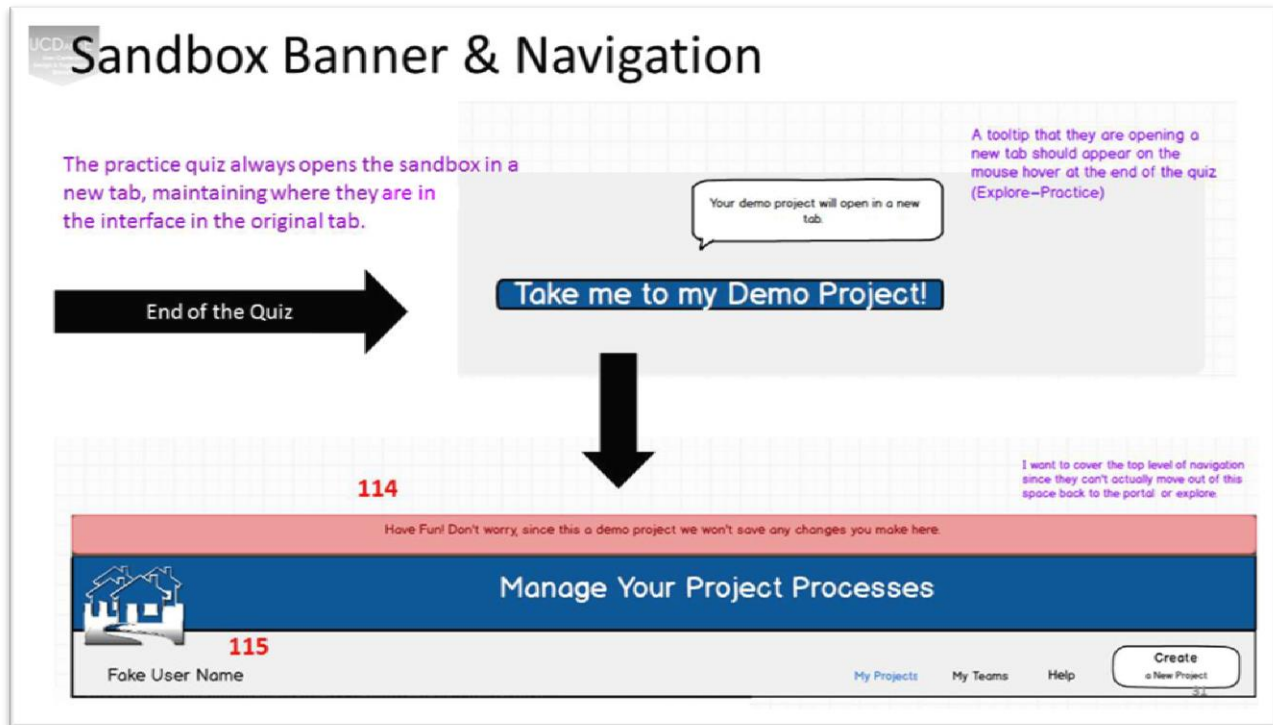


Figure E-29.Sandbox Banner and Navigation.

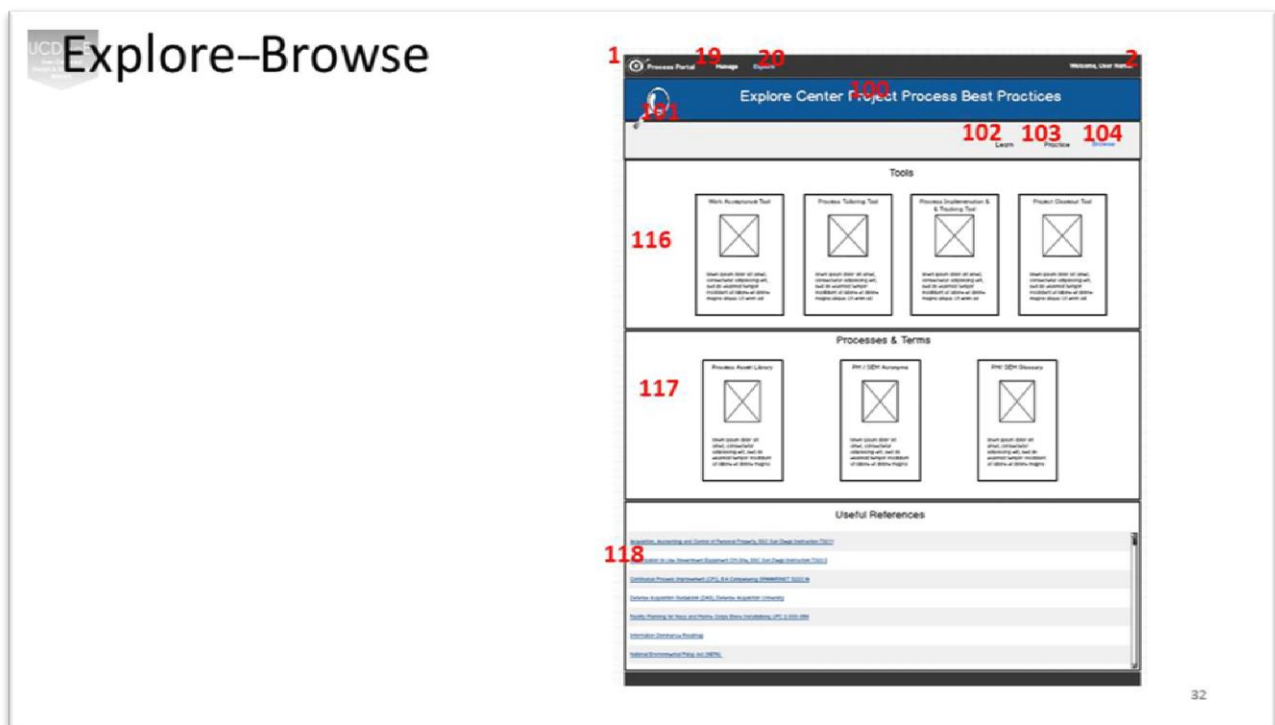


Figure E-30. Explore-Browse.

APPENDIX F

IMPLEMENTATION STATUS TABLE AUGUST 25, 2015 AT SSC PACIFIC

APPENDIX F CONTENTS

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IMPLEMENTATION STATUS TABLE

OVERVIEW

This section contains details for the implementation status for the Project Portal User-Centered Design & Engineering report. Table 1 is based on an Excel[®] spreadsheet and is broken down into five sections.

Table F-1 implementation breakdown is as follows:

- Numbers in the Item # column are directly related to the feature numbers on the figures in Appendix E.
- The first four table rows after the Item # column track implementation status.
- The Page column shows which portal page the feature appears.
- The Element column shows the function that the feature does on the page.
- Any issues specific to the feature are shown in the Issue column.
- If issues were found, any recommended corrective actions are in the Recommendation row.
- The Impact column tracks impact of issues in levels: low, medium, and high.
- The effect on the portal user is shown in the Consequence row.

Table F-2 contains a summary for implementation status as of August 25, 2015 for all numbered items in Table F-1. Figure F-1 shows a pie chart comparing implementation status results by percent.

CORRELATION OF APPENDIX E AND APPENDIX F

Appendix E and Appendix F are directly related to each other in that both link to the same numbers. The relationship of the numbers in the figures in Appendix E and Table F-1 are shown in Figure F-1.

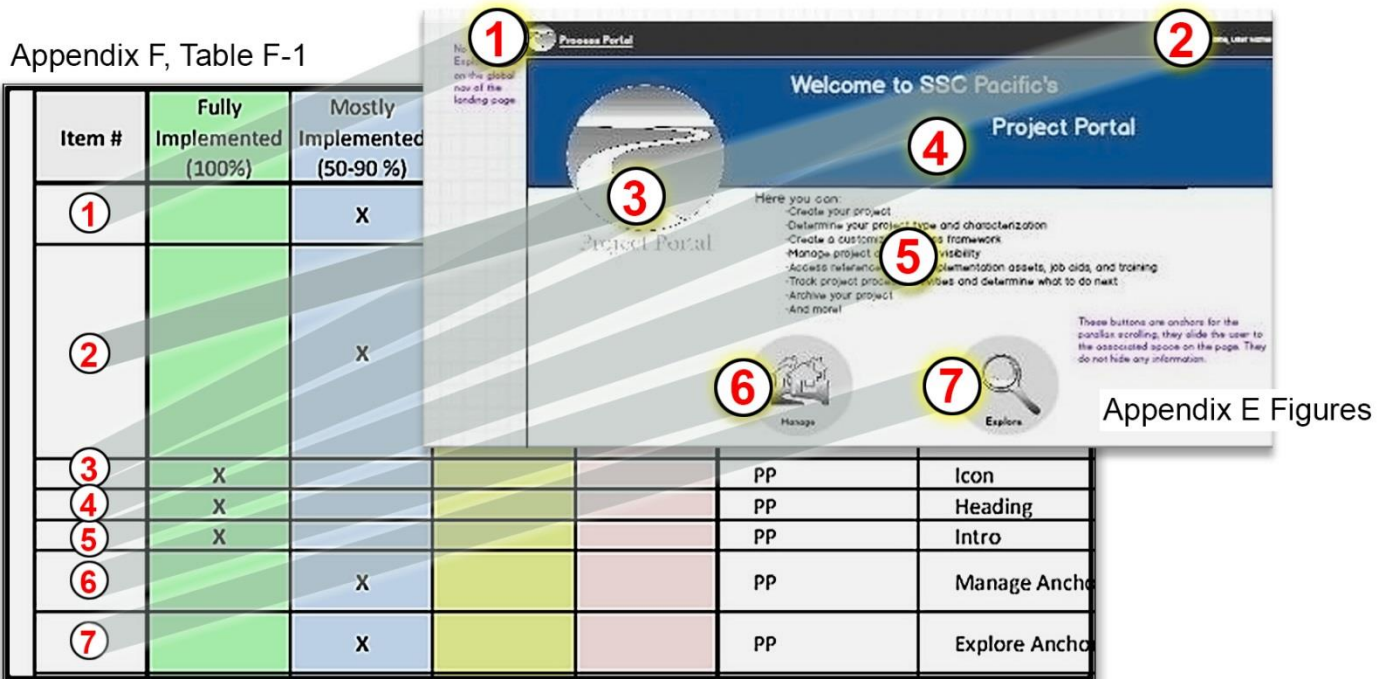


Figure F-1. Appendix E and F number correlations.

Table F-1. Implementation status as of August 25, 2015.

Item #	Fully Implemented (100%)	Mostly Implemented (50-90 %)	Partially Implemented (49-1%)	Not Implemented (0%)	Page	Element	Issue	Recommendation	Impact	Consequence
1		X			PP	Return to Home Nav	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click		
2		X			PP	Welcome ID	1 - Name is all capital letters 2 - After clicking, dotted box around the link is retained	1 - Name should be in sentence case 2 - Make sure box around button is cleared after click	Low	1 - Inconsistent with the rest of the sentence (poor mechanics); does not match "real-world" heuristic; when sets of names are in all capitals, scanning for finding is impeded, thus reducing findability of a particular name. 2 - Impacts professionalism; discourages trust in product
3	X				PP	Icon				
4	X				PP	Heading				
5	X				PP	Intro				
6		X			PP	Manage Anchor	After clicking, box around the anchor is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
7		X			PP	Explore Anchor	After clicking, box around the anchor is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
8				X	PP	Manage	This control and functionality is missing from the developed product		Low-Medium	As the portal grows to include future functionality, these jump controls support users' navigational abilities and serve as visual anchors on the page and to help visually delineate between sections
9	X				PP	Manage Icon				
10	X				PP	Join Button				
11	X				PP	My Projects Button				
12	X				PP	Create Button				
13				X	PP	Explore	This control and functionality is missing from the developed product		Low-Medium	As the portal grows to include future functionality, these jump controls support users' navigational abilities and serve as visual anchors on the page and to help visually delineate between sections
14	X				PP	Explore Icon				
15	X				PP	Learn Button				
16	X				PP	Practice Button				
17	X				PP	Browse Button				
18				X	PP	Footer Links	Footer doesn't match design	rewrite	High	contact information and links need to be present; site map provides users with additional navigation; supports branding; may enhance trust in product
19		X			Global NAV	Manage link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
20		X			Global NAV	Explore link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
21	X				Manage NAV	Title				
22	X				Manage NAV	Icon				
23		X			Manage NAV	User Name	Name is all capital letters	Name should be in sentence case	Low	Inconsistent with the rest of the sentence (poor mechanics); does not match "real world" heuristic
24		X			Manage NAV	My Projects link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
25		X			Manage NAV	My Teams link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
26		X			Manage NAV	Help link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click	Low	Impacts professionalism; discourages trust in product
27	X				Manage NAV	Create a Project				
28		X			My Projects	Workspace	Project Cards are displayed in no discernible default order			

Table F-1. Implementation status as of August 25, 2015. (continued).

Item #	Fully Implemented (100%)	Mostly Implemented (50-90 %)	Partially Implemented (49-1%)	Not Implemented (0%)	Page	Element	Issue	Recommendation	Impact	Consequence
29	X				My Projects	Project cards				
30	X				Project Card	Short Name				
31	X				Project Card	Logo				
32		X			Project Card	Content	1 - Temporary ID number is visible to user 2 - Process/Activity language is unclear	1 - Remove TID# from display 2 - Change "Activity" to "Last Activity Completed"	1 - Low-Medium 2 - Medium	1 - Confusing and/or unimportant to user. Unneeded information. Should be transparent to user. 2 - Creates uncertainty in understanding temporal awareness. Need to use precise language.
33			X		Project Card	PM Name	1 - "PM" is used instead of "Project Manager" 2 - Names displayed in all capitals	1 - "Project Manager" needs to be spelled out 2 - Sentence case capitalization should be used for names	1 - Low 2 - Low	1 - Acronym can be ambiguous to users 2 - Inconsistent (poor mechanics); does not match "real world" heuristic
34	X				New Project	Short Name				
35	X				New Project	Logo				
36	X				Button	Create a Project (Workspace)				
37	X				Button	Join a Project				
38		X			My Projects	List View Selector	Icon is not visible in some configurations using Internet Explorer	Troubleshoot and fix	Low	Loss of salience; confusion; inconsistency; discourages trust in product
39		X			My Projects	Grid View Selector	Icon is not visible in some configurations using Internet Explorer	Troubleshoot and fix	Low	Loss of salience; confusion; inconsistency; discourages trust in product
***	Not	In	Delivered	Design	My Projects	Export List	Icon is not visible in some configurations using Internet Explorer	Troubleshoot and fix	Low	Loss of salience; confusion; inconsistency; discourages trust in product
40				X	My Projects	Card/List Sort	Does not sort by project characteristics as designed	Add sort-by-characteristic functionality as recommended in delivered design	Medium-High	Large data sets are difficult to manage, inadequate sorting capability denies users a useful tool for managing data
41			X		My Projects	List View Table	1 - No Create affordance 2 - No Join affordance 3 - No ability to sort by column	1 - List view needs a way to enable user to Create a project, either through a button or line at the bottom of the table 2 - List view needs a way to enable user to Join a project, either through a button or line at the bottom of the table 3 - Add sort-by-characteristic functionality as recommended in delivered design	1 - Medium 2 - Medium 3 - Medium-High	1 - User must navigate to another part of the interface to accomplish task 2 - User must navigate to another part of the interface to accomplish task 3 - Large data sets are difficult to manage, inadequate sorting capability denies users a useful tool for managing data
42		X			My Projects	Project Status Filter	Imprecise language, ambiguous terminology	Change "Pending", "Active", and "Closed" as directed in delivered design	Low-Medium	Users may not inherently understand what these terms mean. Providing more descriptive language enhances clarity.
43				X	Join A Project	Respond to Alert	Not currently implemented - users mandated, not invited to projects	Create as recommended in delivered design	Low-Medium	
44				X	Join A Project	Project invitation Menu	Not currently implemented - users mandated, not invited to projects	Create as recommended in delivered design	Low-Medium	
45				X	Join A Project	Joined Alert	Not currently implemented - users mandated, not invited to projects	Create as recommended in delivered design	Low-Medium	

Table F-1. Implementation status as of August 25, 2015. (continued).

Item #	Fully Implemented (100%)	Mostly Implemented (50-90 %)	Partially Implemented (49-1%)	Not Implemented (0%)	Page	Element	Issue	Recommendation	Impact	Consequence
46				X	Join A Project	Declined to Join Alert	Not currently implemented - users mandated, not invited to projects	Create as recommended in delivered design	Low-Medium	
47				X	Join A Project	Join Pending Alert	Not currently implemented - Join a Project wizard still under development	Create as recommended in delivered design	Low-Medium	
48				X	Join A Project	Join Accepted Alert	Not currently implemented - Join a Project wizard still under development	Create as recommended in delivered design	Low-Medium	
49				X	Join A Project	Join Rejected Alert	Not currently implemented - Join a Project wizard still under development	Create as recommended in delivered design	Low-Medium	
50		X			My Teams	Workspace	Projects are displayed in no discernible default order (though Project Team Members are displayed alphabetically within a project)	Default display Team members alphabetically within projects displayed alphabetically	Medium	Large data sets are difficult to manage, random default display of content is confusing.
51	X				My Teams	Add TM Button				
52	Not	In	Delivered	Design	My Teams	Remove TM Button				
53	X				My Teams	Download Roster Button				
54	X				My Teams	My Teams Roster Table				
55				X	My Teams	My Teams Roster Filter/Sort	Does not filter or sort by personnel attributes characteristics as designed	Add filter/sort functionality as recommended in delivered design	Medium-High	Large data sets are difficult to manage, inadequate sorting capability denies users a useful tool for managing data
56		X			Add Team Member	Wizard	Search results are not ordered	Order search results alphabetically	Low-Medium	Difficulties and oversight finding the correct person in a high-population search
57				X	Add Team Member	Hover Descriptions	Not implemented	Implement	Low-Medium	Guides users in correctly choosing desired options
58					Help Menu	Content	Not implemented	Implement	Low-Medium	Help is useful for many users; impact can be lessened with appropriate contact info and support
59	X				Project Dashboard NAV	Project Logo (NAV)				
60		X			Project Dashboard NAV	Project Name	Project name is all capital letters	Change to Sentence Case	Low	Affects consistency; breaks etiquette of professional written language; unnecessary
61		X			Project Dashboard NAV	PMT#	Temporary ID still shows for pending projects.	Remove TID# from display	Low-Medium	Confusing and/or unimportant to user. Unneeded information. Should be transparent to user.
62		X			Project Dashboard NAV	PIT Button	PIT Button moves to middle of page when project dashboard is being displayed on a narrow screen	Make sure the PIT button stays stable to the right of the screen in all display modes	Low-Medium	Moving buttons can be confusing, but are mostly just unprofessional
63	X				Left-Hand NAV	Project Dashboard Nav				
64			X		Left-Hand NAV	Process Nav	1 - Icons (checks, xs, and carrots) don't appear in all computer environments 2 - Suggested color scheme not used	1 - make sure icons appear in all computer environments 2 - Adopt color scheme recommended in design packet	1 - Medium 2 - Medium-High	1 - Affects usability of navigational elements by reducing visibility (change blindness); lower situation awareness 2 - Affects usability of navigational elements by reducing visibility (change blindness); lower situation awareness
65				X	Left-Hand NAV	Project Team Nav	Link goes nowhere	link to project-specific roster of team members	Medium-High	Causes users to be unable to use the link that met users' expectations and mental model the most during user testing
66	-	-	-	-	Left-Hand NAV	Toolkit Nav	Unsure, need to reevaluate when a stable design is available			
67	-	-	-	-	Left-Hand NAV	References Nav	Unsure, need to reevaluate when a stable design is available			
68		X			Project Dashboard WS	Project Information Jumbotron	Project name is all capital letters	Change to Sentence Case	Low	Affects consistency; breaks etiquette of professional written language; unnecessary

Table F-1. Implementation status as of August 25, 2015. (continued).

Item #	Fully Implemented (100%)	Mostly Implemented (50-90 %)	Partially Implemented (49-1%)	Not Implemented (0%)	Page	Element	Issue	Recommendation	Impact	Consequence
69	X				Project Dashboard WS	Project Information Data				
70			X		Project Dashboard WS	Update/Change Buttons	They don't work	Fix	Medium	Causes user confusion and distrust, affects professionalism of design
71	X				Project Dashboard WS	Team Requests Notification Bar				
72	-	-	-	-	Project Dashboard WS	Accordion-style Collapsing	Unsure, need to reevaluate when a stable design is available			
73	X				Project Dashboard WS	Project Logo (Workspace)				
74					Project Dashboard WS	Process Framework Overview	1 - PFO colors do not match final design 2 - Descriptions only appear on click, not hover 3 - User must click again to hide description	1 - Change colors to that in design 2 - Descriptions appear on hover only, non-clickable 3 - Descriptions appear on hover only, non-clickable	1 - Low 2 - Low-Medium 3 - Low-Medium	1 - Multicolored interface draws users' attention unnecessarily 2 - Doesn't match real world best practices for websites 3 - Doesn't match real world best practices for websites
75				X	Project Dashboard WS	Process Change Notifications				
76		X			Project Dashboard WS	Activity Feed Filter	1 - "Everyone" filter is last 2 - Names are in capital letters	1 - "Everyone" filter should be first 2 - Change to Sentence Case	1 - Low-Medium 2 - Low	1 - Eighth numerous team members, the "Everyone" filter may be hidden or difficult to find; breaks users' real-world mental model 2 - Affects consistency; breaks etiquette of professional written language; unnecessary
77	X				Project Dashboard WS	Activity Feed Content				
78				X	Project Dashboard WS	PITT Content				
79			X		Project Dashboard WS	Team Request Wizard	1 - Actions taken on notifications don't work 2 - Notifications don't disappear after taking action	1 - Allow users to respond to notifications successfully 2 - Make notifications disappear after action is taken	1 - Medium-High 2 - Medium	1 - Causes user confusion and distrust, affects professionalism of design 2 - Notification window becomes crowded over time, reduces in usability
80	-	-	-	-	Project Process WS	Content	Unsure, need to reevaluate when a stable design is available			
81	X				Project Process WS	Print Button				
82	-	-	-	-	Project Process WS	Accordion-style Collapsing	Unsure, need to reevaluate when a stable design is available			
83		X			Project Process Activity	Status Selector	1 - Words include "waived" and "incomplete" 2 - Bar doesn't "stick" to top of page as user scrolls	1 - Change to "Skipped" and "In Progress" 2 - Make the Status selector bar "stick" during scroll	1 - Low-Medium 2 - Low-Medium	1 - Confusion and loss of meaning occurs with imprecise language 2 - Loss of situational awareness; confusion; difficulty in completing the task
84	X				Project Process Activity	Content				
85				X	Project Team Roster	Workspace				
86				X	Project Team Roster	Add TM Button				
87				X	Project Team Roster	Remove TM Button				
88				X	Project Team Roster	Download Roster Button				
89				X	Project Team Roster	Project Team Roster Table				
90				X	Project Team Roster	Project Team Roster Filter/Sort				

Table F-1. Implementation status as of August 25, 2015. (continued).

Item #	Fully Implemented (100%)	Mostly Implemented (50-90 %)	Partially Implemented (49-1%)	Not Implemented (0%)	Page	Element	Issue	Recommendation	Impact	Consequence
91		X			Create A Project	Wizard	1 - Project Manager's name is not listed during creation 2 - Wording doesn't match design 3 - Buttons don't match design	1 - List PM name during creation, as recommended in design packet 2 - Adopt wording in design 3 - Make sure buttons describe literal action being taken	1 - Low 2 - Low 3 - Low	1 - Potential to cause confusion; doesn't provide enough user assurance during the task 2 - Doesn't provide enough user assurance during the task 3 - Potential to cause confusion; doesn't properly manage user expectations during the task
92				X	Create A Project	Icon	No icon present	Use recommended icon		
93	X				Create A Project	Input				
94				X	Create A Project	Confirmation	No confirmation window present	Add confirmation window, as recommended in design packet	Medium	Potential to cause confusion; doesn't provide enough user assurance upon task completion
95		X			Req to Join A Project	Wizard	The ability to search by PMT number is not available	Allow users to search by PMT number	Low	May increase difficulty to user to find desired project
96	X				Req to Join A Project	Icon				
97	-	-	-	-	Req to Join A Project	Input	Unsure, need to reevaluate when a stable design is available			
98				X	Req to Join A Project	Confirmation				
99		X			Email Notifications	Content	Doesn't match language recommended in design packet	Adonpt language as recommended in design packet	Low	The user is not fully informed about what they are supposed to do and what will happen next
100	X				Explore NAV	Title				
101	X				Explore NAV	Icon				
102		X			Explore NAV	Learn link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click		
103		X			Explore NAV	Practice link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click		
104		X			Explore NAV	Browse link	After clicking, dotted box around the link is retained	Make sure box around button is cleared after click		
105				X	Learn	Content1				
106				X	Learn	Content2				
107	X				Practice	Title				
108	X				Practice	Icon				
109	X				Practice	Type Selector				
110		X			Practice	Type Slide	Placeholder icons not updated	Replace with approved icons	Low	Inconsistent with overall design
111		X			Practice	Characterization	Placeholder icons not updated	Replace with approved icons	Low	Inconsistent with overall design
112	X				Practice	Characterization Selector				
113				X	Practice	Link to Demo				
114				X	Demo	Banner				
115				X	Demo	User Name				
116				X	Browse	Content1				
117				X	Browse	Content2				
118	-	-	-	-	Browse	References	Unsure, need to reevaluate when a stable design is available			
Totals	40	31	5	32						

Table F-2. Summary table for implementation status as of August 25, 2015.

Implementation Status	Percent completed (%)
Fully Implemented	33.90
Mostly Implemented	26.27
Partially Implemented	4.24
Not Implemented	27.12
Unsure (TBD later)	7.63

A pie chart showing a comparative implementation status is provided in Figure F-2.

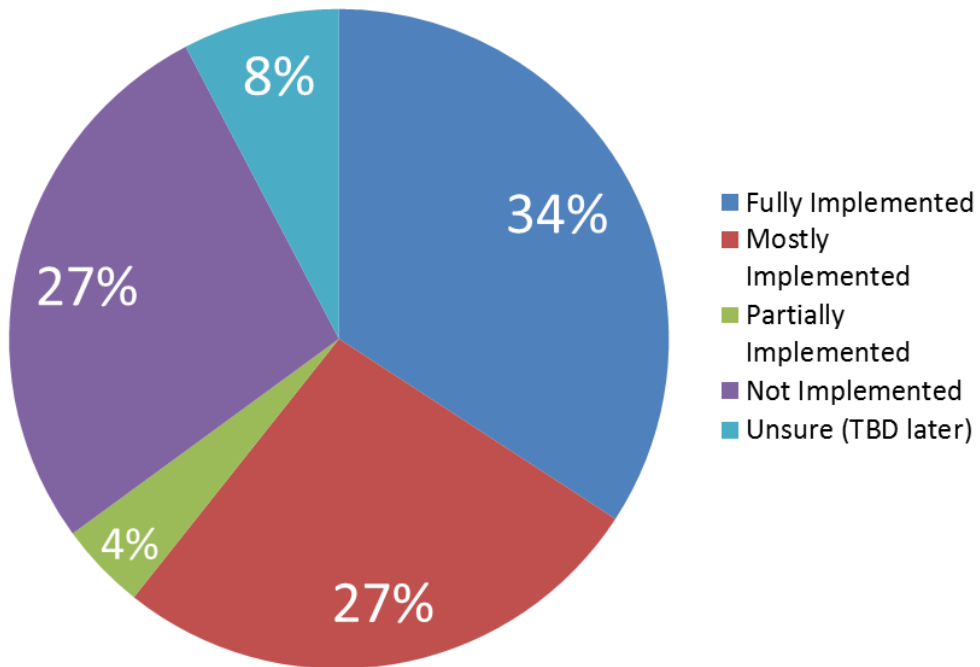


Figure F-2. Comparative implimentation status chart.

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14. ABSTRACT This technical report contains detailed ergonomic research conducted by the User-Centered Design and Engineering (UCD&E) team. The research was specific to the portal. The portal is a web interface SSC software solution for project managers. It is based on web navigation schemes, and follows time-tested human factors of web design. Successful software must be easy to use, ergonomic, and simple in its design. This report details research the UCD&E team conducted that focused on improving those three areas in the portal software interface. The report follows research conducted in many areas. Wireframe usability tests conducted in April 2015 helped isolate user design issues that once resolved made using the portal software much more intuitive. Usability tests conducted in May 2015 focused on improving navigation, interface design and user task performance. Part of the study included an A/B STUDY. The UCD&E team used an eight-question survey to compare four competing design options to understand which of four methods of secondary portal navigation users deemed "easier to use." The result of the A/B study showed two choices testing superior to the rest. Testing included rapid user testing. Rapid user testing allowed suggested user changes to be made to the user interface as soon as a problem is identified. This allowed the solution to be validated quickly whether the solution was successful or needed further work. Research captured a majority of user experience issues. Based on findings, the UCD&E team reported found flaws to the development team. Issues found in the portal software study were used to improve new versions of the portal software.					
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